National Park Service
Cultural Landscapes Inventory

2002

Going-to-the-Sun Road Historic District
Glacier National Park

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Inventory Summary

The Cultural Landscapes Inventory Overview:

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Purpose and Goals of the CLI

The Cultural Landscapes Inventory (CLI), a comprehensive inventory of all cultural landscapes in the national park system, is one of the most ambitious initiatives of the National Park Service (NPS) Park Cultural Landscapes Program. The CLI is an evaluated inventory of all landscapes having historical significance that are listed on or eligible for listing on the National Register of Historic Places, or are otherwise managed as cultural resources through a public planning process and in which the NPS has or plans to acquire any legal interest. The CLI identifies and documents each landscape's location, size, physical development, condition, landscape characteristics, character-defining features, as well as other valuable information useful to park management. Cultural landscapes become approved CLIs when concurrence with the findings is obtained from the park superintendent and all required data fields are entered into a national database. In addition, for landscapes that are not currently listed on the National Register and/or do not have adequate documentation, concurrence is required from the State Historic Preservation Officer or the Keeper of the National Register.

The CLI, like the List of Classified Structures, assists the NPS in its efforts to fulfill the identification and management requirements associated with Section 110(a) of the National Historic Preservation Act, National Park Service Management Policies (2006), and Director's Order #28: Cultural Resource Management. Since launching the CLI nationwide, the NPS, in response to the Government Performance and Results Act (GPRA), is required to report information that respond to NPS strategic plan accomplishments. Two GPRA goals are associated with the CLI: bringing certified cultural landscapes into good condition (Goal 1a7) and increasing the number of CLI records that have complete, accurate, and reliable information (Goal 1b2B).

Scope of the CLI

The information contained within the CLI is gathered from existing secondary sources found in park libraries and archives and at NPS regional offices and centers, as well as through on-site reconnaissance of the existing landscape. The baseline information collected provides a comprehensive look at the historical development and significance of the landscape, placing it in context of the site's overall significance. Documentation and analysis of the existing landscape identifies character-defining characteristics and features, and allows for an evaluation of the landscape's overall integrity and an assessment of the landscape's overall condition. The CLI also provides an illustrative site plan that indicates major features within the inventory unit. Unlike cultural landscape reports, the CLI does not provide management recommendations or

treatment guidelines for the cultural landscape.

Inventory Unit Description:

Going-to-the-Sun Road winds its way east to west through the heart of Glacier National Park, allowing visitors to experience – through driving – the mountains, hanging valleys, rock walls, and glaciers that make up the northern Rocky Mountains. Almost 50 miles in length, the road crosses several distinct zones of vegetation, from lake-filled valleys to an alpine pass crossing the Continental Divide. It is both the only link between the east and west sides of Glacier, and the only extensive automobile route in the park. As such, it defines Glacier's basic circulation pattern and receives heavy amounts of traffic during the summer months. Because of heavy snowfall the road is closed during the winter, opening only after a significant snow-removal effort.

The Sun Road is recognized as a monumental engineering feat and is designated as a National Historical Civil Engineering Landmark and a National Historic Landmark (NHL). Boundaries of the Going-to-the-Sun Road Historic District for Cultural Landscape Inventory purposes follow those established for the NHL nomination, typically extending 30 feet from the center line of the road in either direction to form a corridor. The district begins 30 feet east of the T-junction on the west side of the park (at the southern edge of Lake McDonald) and continues to the eastern park boundary. The district encompasses approximately 355 acres directly surrounding the road; however, views from the road are integral to its function of making park scenery available to visitors, and thus are integral to its character. Going-to-the-Sun Road has National Register significant at the national level under criteria A (association with events that have made a contribution to broad patterns of history) and B (embodying distinctive characteristics of a period and method of construction.) The period of significance is 1921 – 1952.

The historic district's resources – the original roadbed, bridges, tunnels, culverts, retaining walls, and guard walls – were built in the "NPS Rustic" style. Individually, these structures are often significant examples of period engineering and design philosophy; collectively, they comprise a vital, integral component of the road's unique character. Most of these structures were designed to harmonize with the roadway setting by using native materials and by blending with landforms as much as possible. Today, for the most part, the road retains its defining resources and is considered to have retained integrity.

Construction of Going-to-the-Sun Road, by any standard, was a significant undertaking. Even today, visitors to the park marvel at how such a road could have been built and how well it fits into its rugged setting. The road's basic infrastructure was developed between 1921 and 1932; at the end of that time, its entire length was officially open to park visitors. However, no portion of the road was considered complete in 1932. Reconstruction and improvement of the roadbed, bridges, drainage system, and rockwork continued until 1955, when the last section was paved in asphalt.

Between 1956 and 1982 work on the road was limited in scope, focused mainly on routine maintenance and damage repair due to limited funding. Since 1982, when Congress passed the Surface Transportation Assistance Act, $28.6 million has been spent to reconstruct 24.1 miles of the road, mostly in its lower sections. This money was provided by the Federal Highway Administration for emergency repairs and priority projects. At this time the remaining approximately 26 miles are considered to need

drainage improvements, slope stabilization, retaining and guard wall repairs, and roadbed resurfacing. Maintaining the character of these features is paramount in future rehabilitation efforts.

The Going-to-the-Sun Road landscape has many contributing features, fully listed in the Analysis and Evaluation section of this Cultural Landscape Inventory. The road is notable for the fine stonework of many of its bridges, retaining walls and smaller stone features, for its tunnels, for its route carved into the side of the Garden Wall, for the imagination of its designers and the labors of its builders, and for the marvelous views it offers as it climbs and then descends the continental divide.

Site Plan

Plan view of Going-to-the-Sun Road, with significant features called out. Prepared for the Historic American Engineering Record by Tajda Ivanisevic, William Withers, and Albert Debnam in 1990 and 1991.

Property Level and CLI Numbers

Inventory Unit Name:	Going-to-the-Sun Road Historic District
Property Level:	Component Landscape
CLI Identification Number:	890108
Parent Landscape:	890241

Park Information

Park Name and Alpha Code:	Glacier National Park -GLAC
Park Organization Code:	1430
Park Administrative Unit:	Glacier National Park

CLI Hierarchy Description

The Going-to-the-Sun Road was not divided into subunits, and for the purposes of the CLI, the road and its historic district remains as one cohesive landscape.

Although the road is considered a landscape in its own right, it is located within Glacier National Park and managed in the context of the park's portfolio of resources and uses. The 1999 General Management Plan prescribed that road be managed to "retain its historic character and to allow opportunities for visitors to experience the park's magnificent scenery and historic character." It was placed into its own management area with the road itself designated as a visitor service zone providing support services and facilities. Day use areas with easily reachable destinations and interpretive activities are located along the road's corridor, and a backcountry zone focusing on protection of resources and natural processes surrounds the corridor.

Concurrence Status

Inventory Status: Complete

Completion Status Explanatory Narrative:

The inventory was completed using historic information, management documents, site visits, and input from Glacier National Park personnel. Much has been written about the Going-to-the-Sun Road over the years and many already-existing documents describe its history and condition, providing excellent sources for the inventory. Susan Begley and Ethan Carr, National Park Service employees, performed historical research for the 1983 National Register of Historic Places nomination. Detailed studies of the Road's structures were conducted for the Historical American Engineering Record during the 1990s. Historical Research Associates provided a more in-depth historical account in the 1997 National Historic Landmark nomination. Renewable Technologies, Inc. in 2002 created a detailed history and description of the road, including a complete inventory of its features for a Cultural Landscape Report. Also, an advisory committee currently studying the road and its future needs commissioned an engineering study, as well as economic studies, in 2001. A site visit was conducted to verify certain details and document conditions in August 2002.

Concurrence Status:

Park Superintendent Concurrence: Yes

Park Superintendent Date of Concurrence: 09/17/2002

National Register Concurrence: Eligible -- SHPO Consensus Determination

Date of Concurrence Determination: 09/23/2002

National Register Concurrence Narrative:

The Montana SHPO concurred with the findings of the CLI on 09/23/2002.

Concurrence Graphic Information:

United States Department of the Interior

NATIONAL PARK SERVICE
Glacier National Park
West Glacier, Montana 59936

IN REPLY REFER TO:
H30

SEP 16 2002

SEP 2002 Received Glacier National Park

Mark Baumler, Ph. D.
State Historic Preservation Officer
Montana State Historic Preservation Office
Post Office Box 201201
Helena, Montana 59620-1201

Reference: Consensus Determination of Eligibility for listing Going-to-the-Sun Road Cultural Landscape in the National Park Service's Cultural Landscape Inventory

Dear Dr. Baumler:

We are requesting your concurrence in a Consensus Determination of Eligibility for including the Going-to-the-Sun Road Historic District in the National Park Service's Cultural Landscape Inventory (CLI). The CLI is intended to be a comprehensive inventory of all historically significant landscapes within the National Park System. As you are aware, the road was listed in the National Register of Historic Places in 1983, and also was designated a National Historic Landmark in 1997.

Glacier National Park has completed a Cultural Landscape Inventory and Cultural Landscape Report for the Going-to-the-Sun Road. The Cultural Resources staff at the NPS Intermountain Support Office in Denver has taken that information, plus additional research from an on-site visit, and entered it into the Cultural Landscape Automated Management System (CLAIMS), a National Park Service initiative.

To assist in your review, enclosed is a copy of the recently completed Cultural Landscape Report (RTI, 2002) and the Cultural Landscapes Inventory (NPS, 2002) as it will appear in CLAIMS.

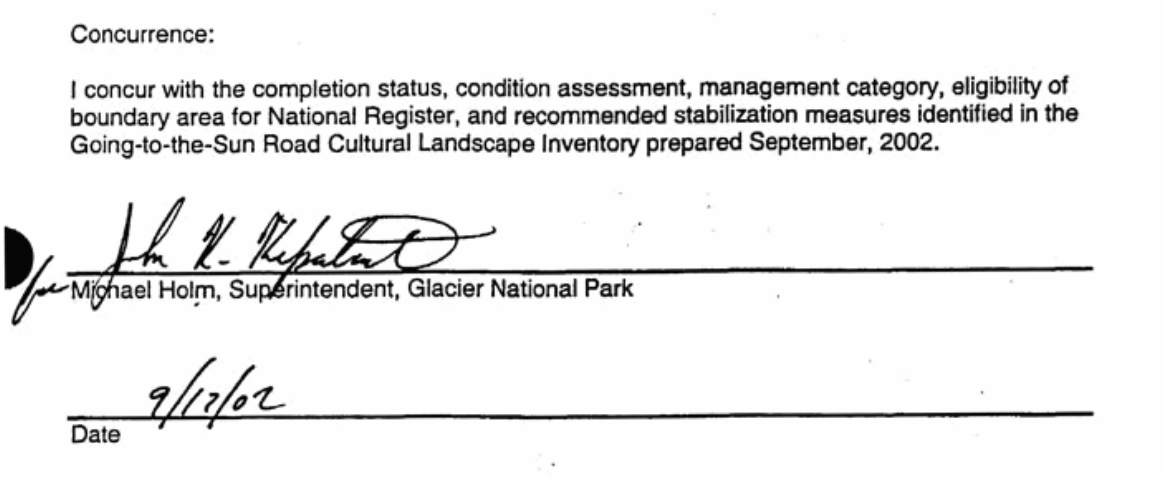
We appreciate your past and ongoing assistance in our efforts to continuously update our historic resources inventory for Going-to-the-Sun Road.

Sincerely,

for Michael O. Holm
Superintendent

Concurrence, Montana State Historic Preservation Officer 9/23/2002

MT SHPO concurrence on the Going-to-the-Sun Road Historic District CLI, 9/17/2002.


Concurrence:

I concur with the completion status, condition assessment, management category, eligibility of boundary area for National Register, and recommended stabilization measures identified in the Going-to-the-Sun Road Cultural Landscape Inventory prepared September, 2002.

for Michael Holm, Superintendent, Glacier National Park

9/17/02
Date

Superintendent concurrence on the Going-to-the-Sun Road Historic District CLI, 9/23/2002.

Chas Cartwright/GLAC/NPS
06/14/2011 01:34 PM

To "Carrie Mardorf" <Carrie_Mardorf@nps.gov>
cc "Mark Biel" <Mark_Biel@nps.gov>, "Lon Johnson" <Lon_Johnson@nps.gov>, "Jack Gordon" <Jack_Gordon@nps.gov>
bcc
Subject Fw: Going to the Sun Condition

Carrie:

I concur that the GTSR cultural landscape is in poor condition.

Chas

Sent from my BlackBerry Wireless Handheld
Chas Cartwright
Superintendent,
Glacier National Park
406-888-7901
chas_cartwright@
nps.gov
Lon Johnson

----- Original Message -----
From: Lon Johnson
Sent: 06/14/2011 01:03 PM MDT
To: Chas Cartwright
Subject: Re: Going to the Sun Condition

Chas:

The Cultural Landscape Inventory database condition for Going-to-the-Sun Road needs to be updated. (Please see message below from regional historical landscape architect.) I spoke with Jack Gordon and he agreed that it should still be listed as "poor". Please forward this message to Carrie Mardorf concurring with the condition.

Thanks.

Lon

Carrie (through the superintendent):

Please continue to list the Going-to-the-Sun Road condition as POOR on the Cultural Landscape Inventory database.

Approximately $80 million has been spent rehabilitating the 50-mile-long Going-to-the-Sun Road since 2007. FHWA just awarded an additional $12 million project to rehabilitate the Haystack to Big Bend section. Rehabilitation of the alpine section of the road continues with one section (between the West Tunnel and Haystack Creek complete and three additional sections nearing completion. Still remaining to be rehabilitated are 17 miles on the east side and 18 miles on the west side, including the repair of a number of significant historic bridges and culverts.

Lon

Lon Johnson
Cultural Resource Specialist/Historical Architect
Division of Science and Resources Management
Glacier National Park
West Glacier, Montana 59936
406.888.7943

Superintendent concurrence on the updated condition assessment, 6/14/2011.

Revisions Impacting Change in Concurrence:

Other

Revision Narrative:

Edited text to correct typos, clarified image sources, and uploaded CLR to the Landscape Documents section, May 2012.

Geographic Information & Location Map

Inventory Unit Boundary Description:

The National Historic Landmark District boundary follows Going-to-the-Sun Road and typically extends 30 feet from the center line of the road in either direction to form a corridor. The district begins 30 feet east of the T-junction on the west side of Glacier National Park (at the southern edge of Lake McDonald) and continues to the eastern Park Boundary. The district therefore forms a corridor 60-foot wide (typically) and 48.7 miles long.

At each pull out (scenic overview), the district widens (if necessary) to encompass the pull out area. In these areas, the boundary of the district extends 10 feet from all paved areas or masonry construction. At Going-to-the-Sun Point, the boundary of the district follows the road to the pull out area (30 feet from the centerline in either direction) and extends 10 feet from all paved areas to encompass the entire area and its retaining walls.

State and County:

State: MT

County: Glacier County

State: MT

County: Flathead County

Size (Acres): 354.18

Boundary UTMS:

Source:	USGS Map 1:24,000
Type of Point:	Line
Datum:	NAD 27
UTM Zone:	12
UTM Easting:	294,550
UTM Northing:	5,394,950
Source:	USGS Map 1:24,000
Type of Point:	Line
Datum:	NAD 27
UTM Zone:	12
UTM Easting:	315,000
UTM Northing:	5,395,000
Source:	USGS Map 1:24,000
Type of Point:	Line
Datum:	NAD 27
UTM Zone:	12
UTM Easting:	304,700
UTM Northing:	5,396,350
Source:	USGS Map 1:24,000
Type of Point:	Line
Datum:	NAD 27
UTM Zone:	12
UTM Easting:	293,400
UTM Northing:	5,394,350
Source:	USGS Map 1:24,000

Type of Point:	Line
Datum:	NAD 27
UTM Zone:	12
UTM Easting:	300,600
UTM Northing:	5,399,350
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Type of Point:	Line
Datum:	NAD 27
UTM Zone:	12
UTM Easting:	298,900
UTM Northing:	5,400,900
Source:	USGS Map 1:24,000
Type of Point:	Line
Datum:	NAD 27
UTM Zone:	12
UTM Easting:	310,800
UTM Northing:	5,393,900
Source:	USGS Map 1:24,000
Type of Point:	Line
Datum:	NAD 27
UTM Zone:	12
UTM Easting:	294,950
UTM Northing:	5,399,150
Source:	USGS Map 1:24,000
Type of Point:	Line
Datum:	NAD 27
UTM Zone:	12

UTM Easting:	321,000
UTM Northing:	5,402,000
Source:	USGS Map 1:24,000
Type of Point:	Line
Datum:	NAD 27
UTM Zone:	12
UTM Easting:	297,850
UTM Northing:	5,402,600
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Datum:	NAD 27
UTM Zone:	12
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UTM Northing:	5,390,000
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UTM Northing:	5,388,500
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Type of Point:	Line
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UTM Zone:	12
UTM Easting:	283,000
UTM Northing:	5,381,350

Source:	USGS Map 1:24,000
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UTM Zone:	12
UTM Easting:	271,650
UTM Northing:	5,376,800
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UTM Northing:	5,390,150
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UTM Easting:	273,100
UTM Northing:	5,378,450
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UTM Northing:	5,401,300
Source:	USGS Map 1:24,000
Type of Point:	Line

Datum:	NAD 27
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UTM Easting:	312,800
UTM Northing:	5,395,000
Source:	USGS Map 1:24,000
Type of Point:	Line
Datum:	NAD 27
UTM Zone:	12
UTM Easting:	306,300
UTM Northing:	5,393,650
Source:	USGS Map 1:24,000
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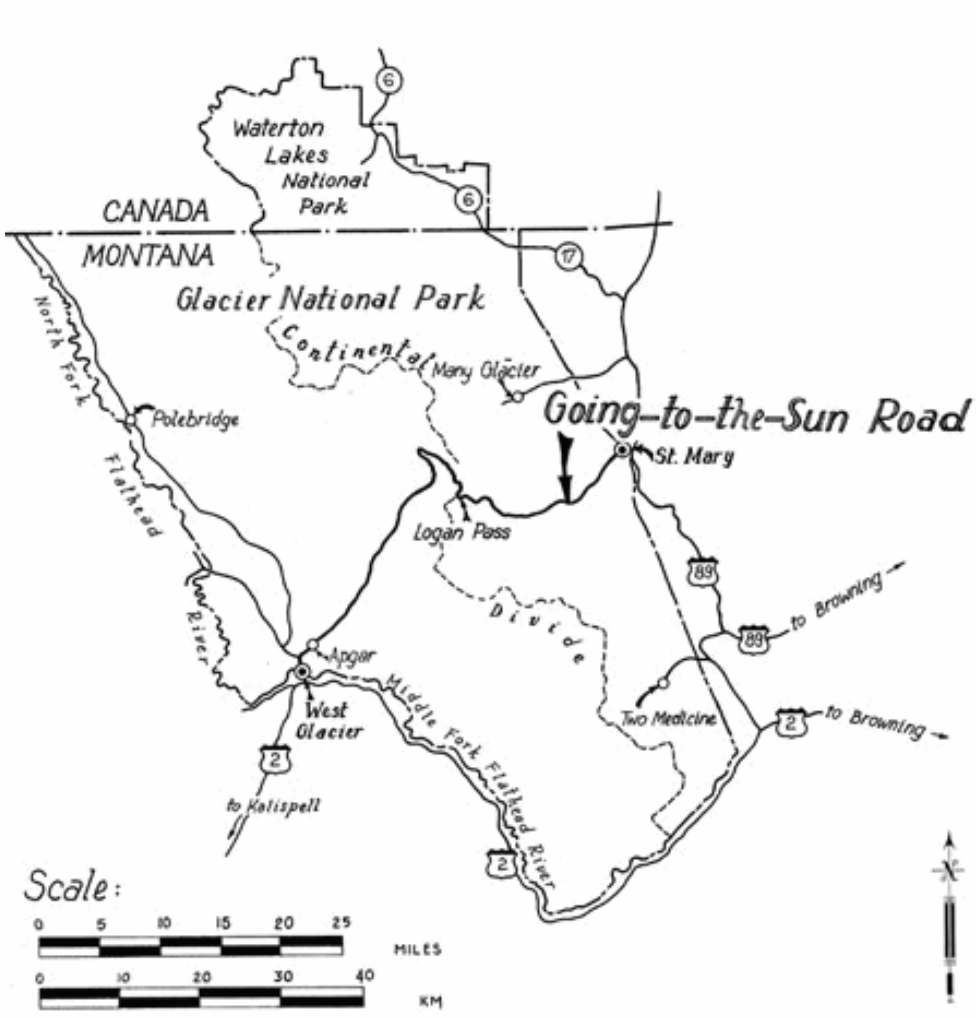
Datum:	NAD 27
UTM Zone:	12
UTM Easting:	301,000
UTM Northing:	5,395,900

Location Map:



Location of Going-to-the-Sun Road within Glacier National Park. Adapted from map prepared for the Historic American Engineering Record by Tajda Ivanisevic and Albert Debnam in 1990 and 1991.

Location of Glacier National Park. Adapted from map prepared for the Historic American Engineering Record by Tajda Ivanisevic and Albert Debnam in 1990 and 1991.

Regional Context:

Type of Context: Cultural

Description:

Going-to-the-Sun Road is associated with early stages of the American park movement. The initiation of "landscape engineering" that combined civil engineering with landscape architectural design and concern for the preservation of scenery. This practice was an essential step in making large scenic reservations accessible without unduly marring landscape scenery or natural systems, and was seen as exemplifying the effort to make the parks accessible while preserving them for the future. Because of its early place in the park movement, and its bridges and walls skillfully crafted of native stone, Going-to-the-Sun Road helped set the standard for future NPS road projects based on a strong landscape philosophy.

The Sun Road is also nationally significant in the history of transportation technology because of its unprecedented engineering and its place as a link in the Park-to-Park Highway first advocated by Stephen Mather in 1915. More than any park road project, Going-to-the-Sun Road embodied Stephen Mather's evolving hopes and policies for developing the national parks as a coordinated system. Crucial not only to the future development of Glacier National Park, Going-to-the-Sun Road erased the single greatest deficiency in Mather's Park-to-Park Highway route. Although there are other interesting examples of Park Service/Bureau of Public Roads design of this period and later, no other road combines the historic associations, the artistic and engineering significance, and the excellent state of preservation of Going-to-the-Sun Road.

Although not specifically associated with Going-to-the-Sun Road's history, Native Americans regard the Glacier National Park region an area of profound importance. The Kootenai (also known as the K'tunaxa) and the Blackfeet (also known as the Piikáni) tribes' traditional associations extend back well over a thousand years. One of their trails followed much the route of current day Going-to-the-Sun Road, with Logan Pass used as a way over the Continental Divide and summer camping area. The foot of Lake McDonald was the site of a Kootenai religious ceremony, and the St. Mary valley provided prime campsites and hunting grounds for both tribes. The Blackfeet have played a very important role in Glacier National Park's image, partly due to the Great Northern Railway's use of their image in promoting the park from its inception to the 1950's. Blackfeet "presence" is very much associated with official "goings-on" in the park. As a "feature event," the Blackfeet and Kootenai held a peace ceremony - the first since one held in 1868 - during the 1933 opening ceremonies for the Going-to-the-Sun Road. Also, the Blackfeet tribal band provided music for the opening ceremonies.

Type of Context: Physiographic

Description:

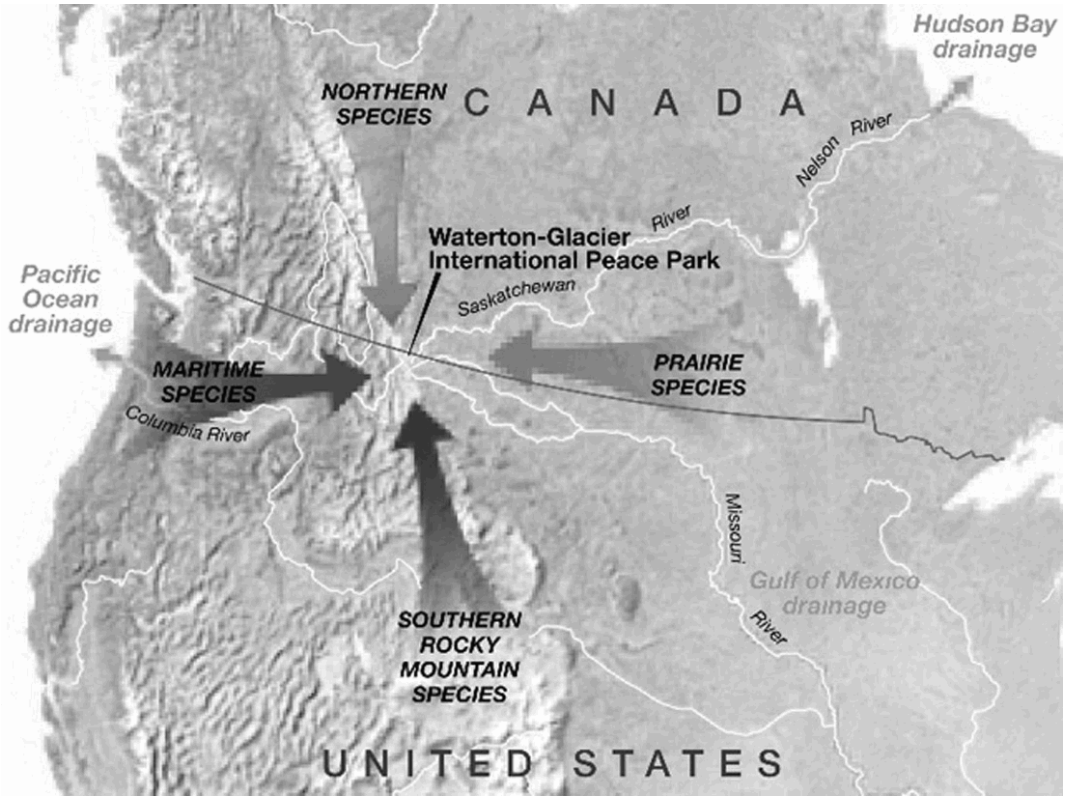
The landscape of Glacier National Park – its mountains, hanging valleys, and rock walls – provides the overall setting for Going-to-the-Sun Road. The Park sits at the apex of three oceans that bound the North American continent (a triple divide), and consists of

glacier-sculpted peaks in the 8,000 to 10,000 foot range, and crystalline lakes.

This landscape is the result of geologic forces of mountain building, erosion, and glaciation over more than a billion years. Ancient marine sediments hardened into limestone, shale, and sandstone which around 60 million years ago began to warp, fold, and finally break due to geologic pressure. Great slabs of rock were thrust upward from west to east, over-riding other masses of rock. In some places rock was thrust upward five to ten miles. Eventually, the slabs of rock had moved more than 50 miles to the east creating the Livingston Range on the western edge of the park, and the Lewis range along the continental divide. However, uplifted areas quickly eroded by wind, water, and ice.

Massive glaciers shaped and carved the land during the past three million years, cutting U-shaped valleys. Smaller tributary glaciers created hanging valleys. Today, waterfalls plunge from these hanging valleys to lower elevations, and several small alpine glaciers of relatively recent origin dot the mountains. The Road follows lakes and streambeds both east and west of Logan Pass, and crosses several areas of distinct vegetation. The high mountains contain dense forests of larch, spruce, fir, and lodgepole pine. In the Lake McDonald valley, forests of western red cedar and hemlock are common. The alpine areas provide a setting for wildflowers that include heather gentian, beargrass, and glacier lily. East of the Logan Pass, where the mountains give way to plains, pasque flower, lupine, Indian paintbrush, gaillardia, asters, and shooting stars predominate.

The Park is home to 57 species of mammals and more than 210 species of birds. Bighorn sheep, mountain goats, wapiti (elk), black bear, whitetail deer, and mule deer are frequently seen. Grizzly bear, moose, wolves, and mule deer also live in the Park year-round. Locally prevalent birds include osprey, ptarmigan, golden eagle, Clark's nutcracker, Harlequin duck, and bald eagle.



Glacier National Park sits at the top of North America's three major watersheds, and on the edge of the Rocky Mountains and Great Plains regions. As a result, it has diverse plant and animal species. (From Glacier National Park informational materials)

Type of Context: Political

Description:

Going-to-the-Sun Road is located wholly within the boundaries of Glacier National Park. Glacier National park is located in northwestern Montana on the U.S./Canadian border. It is bordered on the south by the Lewis and Clark National Forest, on the west by the Flathead National Forest, and on the east by the Blackfeet Indian Reservation. The road links Flathead and Glacier counties in the state of Montana.

Canada's Waterton Lakes National Park lies to the North. Waterton Lakes and Glacier National Parks were designated Waterton-Glacier International Peace Park in 1932 to foster peace and goodwill between the U.S. and Canada. This combined Park was designated a World Heritage Site in 1995 to foster resource management that protects each country's site.

Glacier National Park is considered an economic engine for Glacier and Flathead counties, as conservative economic models project that approximately $145 million and 2,100 jobs are generated annually by the park. Much of this economic activity takes place during the four to

five month period that the Logan Pass section of the Sun Road is open. Traditionally, tourist-dependent businesses have opposed repairs that result in road closures of even short duration.

Management Unit: Glacier National Park

Management Information

General Management Information

Management Category: Must be Preserved and Maintained

Management Category Date: 04/01/1999

Management Category Explanatory Narrative:

Glacier National Park's Final General Management Plan (1999) listed preservation of Going-to-the-Sun Road as a goal. The plan details were partly the result of the 1997 National Historic Landmark (NHL) listing, and built upon the Cultural Resource Plan created for the road in 1991. As the main thoroughfare through the park and its NHL listing the Road must be preserved and maintained.

Agreements, Legal Interest, and Access

Management Agreement:

Type of Agreement:

Management Agreement Explanatory Narrative:

There are no management agreements associated with Going-to-the-Sun Road.

NPS Legal Interest:

Type of Interest: Fee Simple

Public Access:

Type of Access: Other Restrictions

Explanatory Narrative:

Due to the Road's steepness, vehicles longer than 21 feet or wider than 8 feet (including mirrors) are not allowed between the Avalanche campground and Sun Point parking area.

Adjacent Lands Information

Do Adjacent Lands Contribute? Yes

Adjacent Lands Description:

Although the historic district for Going-to-the-Sun Road encompasses only 30 feet on either side of the roadbed, the surrounding landscape of Glacier National Park's mountains, hanging valleys, lakes, rock walls, and glaciers contains the scenic setting the road was designed to exploit. Specifically, this landscape includes the area around Lake McDonald, the McDonald Creek valley and its surrounding peaks, meadows and peaks visible from Logan Pass, the St. Mary valley and its surrounding peaks, and the area around St. Mary Lake. These lands are currently open and undeveloped, substantially unchanged since the Road was planned in the early 1900s.

Although they are not included in the road's historic district, campgrounds located west of Logan Pass contribute to the historic character of the Sun Road corridor. They were developed during the road's historic period. Apgar, at the foot of Lake McDonald, began as a CCC camp that was formalized as a tourist campground in 1939. Sprague Creek, further up the shore of Lake McDonald, and Avalanche, adjacent to Avalanche Creek, were used early on as camps for railroad tourists and road building activities. They appear to have been formalized for automobile camping in the 1920s, as the 1926 park superintendant's report describes them as the most important campsites in Glacier. For the most part, Avalanche and Sprague Creek retain integrity of their early period and contribute to the historic character of the Sun Road corridor for visitors choosing to visit them.

Land outside of Glacier National Park's boundaries is not visible from the road, is not integral to its circulation system, and does not contribute to the road's context.

View of the McDonald Creek valley as seen from Sun Road near Logan Pass. (2002 photograph, NPS)

St. Mary Lake as viewed from pullout. (2002 photograph, NPS)

National Register Information

Existing National Register Status

National Register Landscape Documentation:

Entered Documented

National Register Explanatory Narrative:

The road was listed in the National Register on June 16, 1983. The nomination included the roadway itself, eight bridges and two tunnels as contributing resources.

At a meeting on November 21, 1996, the National Park System Advisory Board recommended the road be designated as a National Historic Landmark. On February 18, 1997, the road was officially designated a National Historic Landmark "district" with the roadway itself, 12 bridges and culverts, and 2 tunnels listed as contributing resources.

The Montana State Historic Preservation Officer concurred with the Cultural Landscape Inventory's conclusion that the road qualifies as a cultural landscape on 09/23/2002. The current National Register documentation is considered adequate and not in need of modification.

Existing NRIS Information:

Name in National Register:	Going-to-the-Sun Road
NRIS Number:	83001070
Other Names:	None
Primary Certification:	Listed In The National Register
Primary Certification Date:	06/16/1983
Name in National Register:	Going-to-the-Sun Road
NRIS Number:	97000345
Other Names:	Transmountain Highway;Going-to-the-Sun Highway;see also 8300
Primary Certification:	Listed In The National Register
Primary Certification Date:	02/18/1997
	Designated National Landmark - 2/19/1997

National Register Eligibility

National Register Concurrence:	Eligible -- SHPO Consensus Determination
Contributing/Individual:	Individual
National Register Classification:	District
Significance Level:	National
Significance Criteria:	A - Associated with events significant to broad patterns of our history
Significance Criteria:	C - Embodies distinctive construction, work of master, or high artistic values
Period of Significance:	
Time Period:	AD 1921 - 1952
Historic Context Theme:	Expressing Cultural Values
Subtheme:	Landscape Architecture
Facet:	Development Of Transportation And Land Tenure Systems
Other Facet:	None
Time Period:	AD 1921 - 1952
Historic Context Theme:	Transforming the Environment
Subtheme:	Conservation of Natural Resources
Facet:	Origins Of The National Parks Movement
Other Facet:	None

Area of Significance:

Area of Significance Category:	Landscape Architecture
Area of Significance Subcategory:	None
Area of Significance Category:	Transportation
Area of Significance Subcategory:	None
Area of Significance Category:	Politics - Government
Area of Significance Subcategory:	None

Statement of Significance:

Going-to-the-Sun Road is important for its role in National Park development, and is a feat of early road design that employed advanced "landscape engineering." It was originally listed on the National Register of Historic Places in 1983, became a National Historical Civil Engineering Landmark in 1985, and was designated a National Historic Landmark in 1997. The road is located in the middle of Glacier National Park, spanning the park from east to west, from the St. Mary's entrance, across the continental divide, to the West Glacier entrance. The Going-to-the-Sun Road's designated historic district encompasses 48.7 miles of the road, from the foot of Lake McDonald to the Divide Creek on the eastern park boundary, approximately 355 acres. The landscape's period of significance is 1921-1952.

Nationally, completion of Going-to-the-Sun Road marked the first product of the 1926 National Park Service/Bureau of Public Roads interagency agreement facilitating the cooperative construction of park roads. The experience of building the Sun Road shaped subsequent mountain road construction standards and cooperative administrative procedures between the two agencies. The road also was an early indicator of the importance of auto tourism in national parks, and its role in providing accessibility for the visiting public. Locally, its construction enabled a significant increase in local tourism, and marked a dramatic shift in the patterns of visitor use in Glacier as it encouraged use of private automobiles as the primary means to see the park. Since the entire road opened to the public in 1932, driving the road has been one of the primary ways that visitors see and experience the park. The extraordinary qualities of the Road have made it one of the primary attractions for Glacier visitors, and it has become perhaps the most noted highway in the entire National Park system.

The historic district's resources – the original road, bridges, tunnels, culverts, retaining walls, and almost 40,000 feet of guardwalls – were built between 1921 and 1952 in the "NPS Rustic" style. Individually, these structures are often significant examples of period engineering and design philosophy; collectively,

they comprise a vital, integral component of the road's unique character. The masonry features along the Sun Road – including guardwalls, retaining walls, bridges, and culvert headwalls – are vital in defining the road's historic, visual, and engineering character. Most of these structures were designed to harmonize with the roadway setting by using native materials and by blending with landforms as much as possible. There was little precedent for this sort of work on National Park roads, and the original designs were often modified in the field. Many of the designs developed on the Sun Road appeared in specifications for later NPS contracts in other parks.

Although there are other interesting examples of Park Service/Bureau of Public Roads design of this period and later, no other road combines the historic associations, the artistic and engineering significance, and the excellent state of preservation of Going-to-the-Sun Road.

Following are criteria, contributing resources, and contributing structures identified in the 1997 National Historic Landmark nomination:

Criterion A – associated with events that have made a significant contribution to the broad patterns of our history:

The Going-to-the-Sun Road Historic District is significant under Criterion A for its association with the American park movement. The initiation of "landscape engineering" that employed advanced engineering combined with landscape architectural design and concern for the preservation of scenery was an essential step in making large scenic reservations accessible to the visiting public without unduly marring landscape scenery or natural systems.

Criterion C – embodies distinctive characteristics of a type, or period, or method of construction; or represents work of a master; or possesses high artistic values; or represents a significant or distinguishable entity whose components lack individual distinction:

The Going-to-the-Sun Road Historic District is also significant under Criterion C for its representation of the as an exceptionally valuable example of American landscape architecture, specifically as a distinctive and outstanding example of "landscape engineering" that blended the practices of civil engineering and landscape architecture. The Going-to-the-Sun Road Historic District is also nationally significant in the history of technology (transportation) because of its unprecedented engineering and its place as a link in the Park-to-Park Highway, first advocated by Stephen Mather in 1915.

Landscape Characteristics, as identified in the 1997 NHL nomination:

Spatial Organization
Circulation
Topography
Vegetation
Structures

Contributing Resources, as identified in the 1997 NHL nomination:

Going-to-the-Sun Road*
Sprague Creek Culvert
Snyder Creek Culvert
Horse Trail Underpass
Avalanche Creek Bridge
Logan Creek Bridge
West Side Tunnel
Granite Creek Culvert
Haystack Creek Culvert
Triple Arches Bridge
East Side Tunnel
Siyeh Creek Culvert
Baring Creek Bridge
St. Mary River Bridge
Divide Creek Bridge

Materials, as identified in the 1997 NHL nomination:

Pavements and Curbs: Packed Earth, Gravel, Asphalt, Stone, Concrete
Guardwalls and Other Landscape Structures: Concrete, Sandstone, Argillite

*includes roadbed, culverts, guardwalls, and all structures not listed individually

Chronology & Physical History

Cultural Landscape Type and Use

Cultural Landscape Type: Designed

Current and Historic Use/Function:

Primary Historic Function: Automobile

Primary Current Use: Automobile

Other Use/Function	Other Type of Use or Function
Leisure-Passive (Park)	Both Current And Historic
Outdoor Recreation	Both Current And Historic
Automobile	Both Current And Historic

Current and Historic Names:

Name	Type of Name
Going-to-the-Sun Highway	Historic
Going-to-the-Sun Road	Both Current And Historic
Transmountain Highway	Historic

Ethnographic Study Conducted: Yes-Unrestricted Information

Associated Group:

Name of Group: Kootenai

Type of Association: Historic

Name of Group: Blackfeet

Type of Association: Both Current And Historic

Ethnographic Significance Description:

The Glacier National Park region remains an area of profound importance to Native Americans, particularly the Kootenai and the Blackfeet whose traditional associations with the area extend back well over a thousand years. One of their trails followed much of the route of current day Going-to-the-Sun Road, with Logan Pass used as a route over the Continental Divide and summer camping area. The foot of Lake McDonald was the site of a Kootenai religious ceremony, and the St. Mary valley provided prime campsites and hunting grounds for both tribes. Details on each tribe follow.

Kootenai (otherwise known as the K'tunaxa):

This tribe historically lived west of the Continental Divide in the Flathead and Kootenai River Valleys. Linguistic and archeological studies indicate they have been resident in their Rocky Mountain homeland for thousands of years. They traveled eastward over several passes – including "Packs-Pulled-Up" (Logan) – for the winter buffalo hunt. A year-round trail followed the southern shore of Lake McDonald, and then McDonald Creek to Logan Pass, with a winter trail descending to the northern shore of St. Mary Lake. Logan Pass was known to this tribe as "Ancient Road," as legend has it the pass was traversed from earliest times. Plants traditionally collected by this tribe occur in the Glacier National Park region, but there are currently no indications of historic or contemporary collecting activities in the area.

Blackfeet (otherwise known as the Piikáni):

This group, a tribe of the Nitsitapii, is associated with the eastern slopes and adjacent plains of the Glacier National Park region. Their oral history, sacred geography, archeology, linguistics, and genetics suggest they have been resident in this location for thousands of years. The tribe consists of two divisions: the North Piikáni who reside on the Peigan Nation in southwestern Alberta, and the South Piikáni who reside on the Blackfeet Reservation in Montana and officially refer to themselves as the Blackfeet. The tribe camped, hunted, and collected plants in many of the eastern valleys of current day Glacier National Park. The mountains surrounding St. Mary Lake were used for vision quests.

Members of the tribe consider the mountains along the Continental Divide (referred to as “Mistakis”) as sacred. Many fundamental aspects of their traditional religion originated in, and continue to be sustained by, these mountains.

The Blackfeet have played an important role in Glacier National Park’s image, partly due to the Great Northern Railway’s use of their image in promoting the park from its inception to the 1950’s.

Blackfeet “presence” is very much associated with official “goings-on” in the park, including the opening ceremonies in 1933 for the Going-to-the-Sun Road. As a "feature event," the Blackfeet and Kootenai held a peace ceremony at Logan Pass, a meeting place of many previous war parties. The last important peace between these two tribes was made in 1868. In addition to this ceremony, the Blackfeet tribal band provided music for the road's opening ceremonies.

Chronology:

Year	Event	Annotation
AD 1910	Planned	First suggestion for transmountain automotive route through Glacier National Park.
		Robert B. Marshall
AD 1915	Planned	Director of the National Service decides to promote the "Park-to-Park Highway" campaign.
		Stephen B. Mather
AD 1916	Explored	Engineer with Office of Public Roads conducts reconnaissance surveys of several routes for an east-west highway, ultimately recommending a route over Logan Pass. All subsequent planning and surveys follow this general recommendation.
AD 1918	Planned	George Goodwin surveys route over Logan Pass. His route switchbacked up the Valley of Logan Creek, up the side of Haystack Butte and Pollack Mountain, and then on to Logan Pass.
		George Goodwin
AD 1921 - 1924	Built	Road construction begins. Congress appropriated $100,000 for 1921 construction season, $65,000 for 1922, and $100,000 for both 1923 and 1924.
		Carlson-Norman Co.
		Laux & Gardner
		Stevens Brothers

		Stevens Brothers/Thomas McGovern
AD 1922	Established	Park opens road from west entrance to Lake McDonald Lodge.
AD 1924	Expanded	Congress steps-up national park road construction program. $410,000 was earmarked for the Sun Road, and the project was put on an accelerated schedule.
	Designed	Landscape architect Thomas Vint recommends a longer, more expensive route up the west-side carved directly into the steep cliffs of the Garden Wall with only one switchback. He felt this would better conserve the scenery and be more sustainable.
		Thomas Vint
	Designed	Civil Engineer Frank Kittredge completes new survey, locating a route very close to current alignment.
		Frank Kittredge
AD 1925 - 1928	Built	Construction begins on 12.4 mile segment west of Logan Pass, with extensive use of native stone masonry retaining wall, guardwall, bridges, and drainage structures. To stay within budget, road width was held to a 16-foot standard.
		Williams & Douglas
AD 1929	Established	Sun Road opens to public use between West Glacier and Logan pass.
	Altered	Half Moon fire burns Apgar and lower end of Lake McDonald, transforming the redcedar-hemlock climax forest along the first few miles of the Sun Road to an open area dotted with black snags. Views across Lake McDonald became more accessible as a result.
AD 1931	Altered	Lake McDonald section realigned on curves of standard radii of 150 feet or more and widened to 22-24 feet by NPS supervised day-laborers. McDonald Falls widened to provide parking spaces and view point.
AD 1931 - 1933	Built	Road on east side of Logan pass constructed, including the East Side Tunnel, the spur road to Sun Point, and the Baring Creek Bridge.
		A. R. Guthrie & Co.

		Colonial Building Co./A. R. Douglas
AD 1932	Established	Although still under construction, road opens to travel over Logan Pass from both directions in October.
	Built	Parking area at Logan Pass completed, using irregular parking areas separated by islands of vegetation to minimize visual impact.
AD 1933	Established	Road officially opened by U.S. and Canadian Officials. However, no portion of the road was considered to be in a finished condition, and crews were already at work on the first phases of a comprehensive program of improvement and reconstruction.
AD 1933 - 1937	Reconstructed	Roadway west of Logan Creek and east of Logan Pass widened; gravel-surfaced; curvatures and grades reduced; drainage improved; masonry walls, culvert headwalls, bridges constructed; cutslopes and ditches improved; pullouts and wood guard rail installed.
		Archie R. Douglas
		Tomlinson-Arkwright Construction Co.
		J.L. McLaughlin
		Martin Wunderlich
		W.K. Trippet
		Chris Yonlick
		Lawler Corporation
AD 1936	Altered	Heavens Peak fire burns Loop area and over the Divide to Many Glacier, leaving the area almost treeless and resulting in relatively open views from the Road.
AD 1938 - 1939	Paved	21.4 miles from West Glacier to Logan Creek paved with asphalt.
		Carl Nyberg
AD 1939 - 1940	Paved	18.1 miles from Logan Pass to St. Mary paved with asphalt.
		S. Birch & Sons

AD 1941 - 1949	Neglected	No significant work completed, due to World War II and subsequent lack of funds. However, improvement planning resumed in 1948.
AD 1941 - 1942	Altered	Lined East Side Tunnel with concrete, created rock-faced concrete portals to mitigate water seeps that resulted in icy road conditions.
AD 1950 - 1952	Altered	Work resumes on ten mile segment west of Logan Pass: drainage improved; damaged/missing masonry repaired or replaced using non-native Minnesota granite (due to inadequate local stone); installed 1,600 linear feet of log guardrail.
		Morrison-Knudson
AD 1955	Paved	Further work on ten mile segment west of Logan Pass: installed asphalt paving; improved drainage; high scaling of dangerous rock cliffs; roadbed widened through filling cutslope ditches and casting material over side.
		McLaughlin, Inc.
AD 1958 - 1961	Altered	12 new parking areas built at points already used by park visitors, as part of Mission 66. Created spaces for 55 cars.
AD 1964	Damaged	Flood damaged areas near Moose Country and above Avalanche Creek reconstructed to an upgraded width of 28-feet.
	Damaged	Major flood: both Middle Creek and Roes Creek bridges destroyed, and sections of road along upper McDonald Creek wholly reconstructed. Roes bridge replaced with three-span concrete-slab bridge with concrete abutments and solid concrete piers.
AD 1965	Expanded	Logan Pass parking lot expanded as part of visitor center redevelopment. This eliminated the parking lot's character of irregular parking areas located within islands of vegetation.
AD 1966 - 1967	Altered	West Side Tunnel enlarged, straightened, and lined with concrete to eliminate “the worst bottleneck and safety hazard” on the Road. Also, stone Veneer was added to the tunnel portals.

AD 1967	Altered	Garden Wall fire burns the west side of the Garden Wall, leaving the area almost treeless and resulting in relatively open views from the road.
AD 1975	Damaged	Flood damage mandates reconstruction of damaged or destroyed segments of road.
AD 1982 - 2001	Maintained	Road becomes eligible for Highway Trust Fund money available under the Federal Lands Highways Program. Some $28.6 million in repair and rehabilitation on the Road has been undertaken under this program since 1984.
AD 1990 - 1992	Altered	As part of FHWA work on the Lake McDonald stretch, 20 out of 41 pullouts removed due to sight distance and other safety issues.
AD 1991	Planned	NPS and FHWA end safety issue disagreement relating to guardwalls, and agree to develop a crash-test compliant design compatible with historical walls. This replaced the requirement that the road's walls be upgraded to meet national wall-height standards.
AD 1995	Damaged	Heavy rains cause damage to Sun Road near the West Side Tunnel and elsewhere, requiring repairs.
AD 1998	Engineered	Federal Highway Administration evaluation of retaining walls listed serious structural problems at 76 of the 126 walls.

Physical History:

Planning: 1910-1920

The first suggestion for a transmountain automotive route through Glacier was made in 1910 by Robert B. Marshall, the chief geographer of the Geological Survey who five years later would briefly serve as "general superintendent" for national parks. Marshall visited Glacier just after Congress created the park and recommended that a north-south route be located that would begin at Belton (now West Glacier), follow the west side of Lake McDonald, and from the north end of the lake traverse the Continental Divide and connect with the Waterton Lakes near the Canadian border. This road bisecting the length of the park was only one part of Marshall's ambitious proposals in 1910; he recommended a total of 213 miles of "first-class road, with good permanent surface at an estimated cost of two million dollars." In 1911, the Department of the Interior sent another investigator, Edward A. Keyes, who proposed a less ambitious circuit drive around Lake McDonald. Nothing came of either scheme.

In 1915 the Director of the National Park Service, Stephen Mather, decided to promote the "Park-to-Park Highway" campaign with all his enthusiasm. The idea of promoting an interstate automotive route connecting the Western parks in a great loop had first been suggested to him by Denver area boosters at the dedication of Rocky Mountain National Park. Glacier, however, still had practically no roads, and without a transmountain connection it remained "the last unconstructed link" in the park-to-park system.

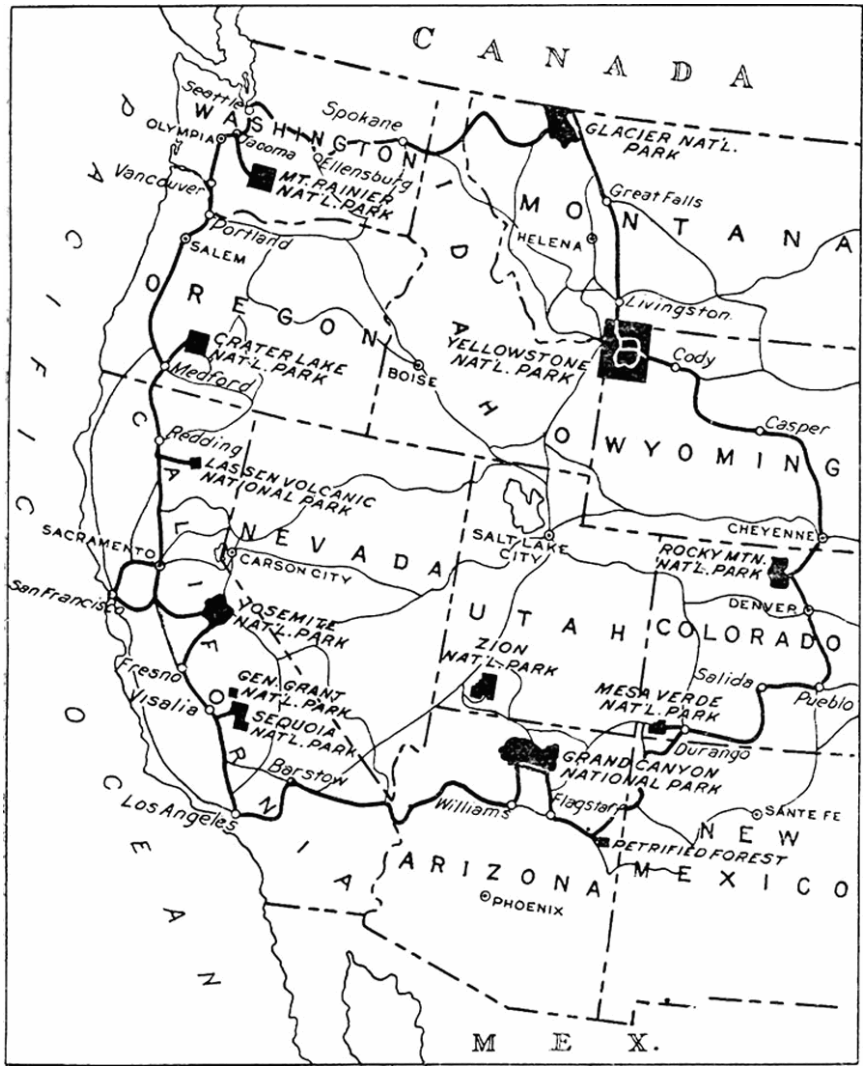
Shortly after joining the Park Service in 1917, George Goodwin was assigned to Glacier to act as superintendent. The engineer had the opportunity that summer to perform reconnaissance surveys for road proposals. The following year Goodwin was made "chief engineer" of the Park Service, responsible for planning and supervising road and trail projects. "The most important project to be developed," he reported that year, was "a transmountain road connecting the east and west sides of Glacier National Park." Goodwin had spent that fall making preliminary surveys for the route, and that winter he developed quantities and estimates for construction.

The terminal locations for Goodwin's 1918 survey had been fixed by initial park developments on both sides of the mountains. On the west side, a two-mile park road led from West Glacier to the foot of Lake McDonald, where a small resort community named Apgar had grown up since the 1890s. Across the mountains on the east side of the park, the spur road that Louis Hill had begun along the north shore of St. Mary Lake provided a similarly convenient and straight route for approaching the Continental Divide from the east, roughly near the center of the park. By 1918 Mather had determined that the transmountain project would begin with the construction of a road along the east shore of Lake McDonald, and that the spur road along St. Mary Lake would be extended to the Going-to-the-Sun Chalets near the head of that lake.

In his 1918 preliminary survey, Goodwin located a route that proceeded from the head of Lake McDonald (near the Glacier Hotel) northwest along McDonald Creek at an average grade of one percent. At the confluence of McDonald and Logan creeks, the route turned west, up the Logan Creek Valley, and ascended about 2,600 feet to Logan Pass. The proposed route crossed Logan Creek seven times in the process, and used effects that drew attention to road

engineering rather than scenery. On the east side of the park the route descended the West Fork of Reynolds Creek through a shorter series of switchbacks at an average grade of six percent, emerging at the shore of St. Mary Lake near the Going-to-the-Sun Chalets. The entire road, about 50 miles from one park entrance to the other, was to be graded (but not paved) to a width of 20 feet with a maximum grade of eight percent and a minimum curvature radius of 50 feet. This recommended route, whatever its merits, was to be altered in 1925 through the survey work of engineer Frank Kittredge and recommendations of landscape architect Thomas Vint. These two felt that Goodwin's proposed route would not only be difficult to later modernize due to its steep grade and tight curves, but would also too strongly dominate scenic views with its prominent switchbacks.

Park appropriations during 1919 and 1920 remained at levels that precluded road construction. During that time, Goodwin served a second tour as Glacier's superintendent, in part because lack of funding forced the engineering office to temporarily suspend operations. While stationed in the park he was able to supervise the construction of a new bridge over the Middle Fork of the Flathead River at West Glacier, but he did not make any other progress on the transmountain project. "Paradoxically as it may be," the engineer reported of his second superintendency of the park, "the one vital missing link that exists in the Park-to-Park Highway is this transmountain road, which will some time become the strong link of the chain.



Going-to-the-Sun Road was considered a crucial link in the 4,700 mile National Park-to-Park Highway promoted by Stephen Mather as part of the Good Roads movement. From the Fourth Annual Report of the National Park Service,"1920.

Construction: 1921-1955

Construction on the east-west highway through Glacier National Park began in earnest in 1921, due to two coinciding events. Goodwin had been advocating a "scenic route" from the foot of Lake McDonald that followed its west shore, emphasizing views up the lake. This route became feasible in 1921 due to four private landowners granting easments through their property. At the same time, Congress made money available for the road by almost doubling Glacier's budget to $195,000, with $100,000 dedicated specifically to the construction of the Transmountain Highway. Goodwin – now working again for the Bureau of Public Roads – immediately prepared grading contracts for the first portion of the road along Lake McDonald.

Bids were scheduled to be opened that August. In the meantime clearing began on the Lake McDonald route using park force account labor. By late summer 1921, motorists could drive to Lake McDonald Lodge for the first time, and the park opened the road to the public in August, 1922.

With construction underway in 1921, local concerns over the practicality of the route immediately surfaced. Good road boosters joined by other local interests now questioned the wisdom of building the much needed transmountain motor road within the national park at all. That April, J.M. Hyde published a scathing editorial in the Cut Bank Pioneer Press titled "That Fairy Highway -Through Glacier National Park." Hyde, the Glacier County Commissioner, claimed that the entire project was a plot by the Great Northern Railroad to prevent a usable automotive route through the mountains from ever being completed. Louis Hill, according to the furious county commissioner, backed the entire scheme in order to retain his lucrative business shipping about 8,000 vehicles annually between East Glacier and West Glacier. The Park Service had been duped into undertaking a Quixotic and expensive road through a pass that would be snowbound "ten or eleven months of the year." Hyde wanted a road built parallel to the Great Northern tracks over the lower, far more practical Marias Pass before any scenic road schemes were funded for the park. A.J. Breitenstein, representing the "Yellowstone-Glacier Bee-Line" (one of the interpark highways being promoted since 1918) also wanted to know why the more practical Marias Pass had not been considered as a route for the Park-to-Park Highway. George Goodwin responded with a long (and at times fanciful) explanation of how the Logan Pass route would only be slightly longer, slightly more expensive, and snowbound only one or at most two extra months of the year. Arguments based on the practicality of the Logan Pass route, however, were easily refuted since a road over the lower Marias Pass, although not the scenic route, obviously would be less expensive and easier to maintain.

The new park superintendent, J. Ross Eakin, joined the effort to ease local concerns regarding the value of the Logan Pass road project. Eakin argued that the two proposed roads (over the Logan and Marias passes) would serve "two distinct purposes." The Logan Pass route, if less convenient, would dramatically complete the Park-to-Park Highway, and it would therefore draw thousands of tourists into the communities surrounding Glacier. The "unspectacular" route would not do this, even if it would serve other useful purposes and would remain open for more of the year. Visiting the Kalispell Chamber of Commerce and other local groups, Eakin reminded businessmen and residents that the purpose of the Transmountain Highway was not just to move local traffic, but to attract tourists from all over the country. Besides, he reassured them, the Park Service would do whatever it could to encourage the Forest Service to build a federal-aid highway over Marias Pass as soon as possible (the proposed route lay almost entirely in the adjacent forest to the south, not in the park).

Goodwin continued to oversee construction over the next three years as Congress appropriated $65,000 for the 1922 construction season and then $100,000 in both 1923 and 1924. At first work was limited almost entirely to the west side of the park in order to make progress toward the Continental Divide so that Congress would not lose interest. In 1922, the first 17 miles of the road were being graded on the west side of the park, along the shore of Lake McDonald

and up McDonald Creek. On the east side, grading on the St. Mary Lake portion of the road began the next year.

After 1924, work would not have to proceed on regular appropriations alone. That December Congress appropriated $1,000,000 for park road construction through a deficiency act. In March, the regular Interior appropriation included an additional $1,500,000 for road construction and carried the authority to obligate against future appropriations for up to another $1,000,000. With millions of dollars now available for improving park roads, Mather faced the need of "suddenly expanding the civil engineering forces" of the Park Service. But the director made no such expansion. He claimed there was a scarcity of "competent road engineers with civil-service status" and blamed the problem on an inadequate pay scale; but clearly other concerns had begun to undermine the director's confidence in his bureau's engineering capabilities.

Concerned that Goodwin's proposed alignment over Logan Pass would mar Glacier's scenery, Mather went to Glacier during the summer of 1924 to inspect the route. Daniel Hull – the project Landscape Architect –did not accompany the director on his visit as would have been customary. Instead he sent Thomas Vint, his assistant, because he typically was not interested in being involved in more demanding engineering issues such as route location, roadway geometry, and construction standards. At the park, Mather spent a day riding over the divide inspecting the preliminary survey route with Goodwin, Vint, and the new superintendent at Glacier, Charles J. Kraebel.

Dismounting a few miles west of Logan Pass, the group took in the view of Logan Creek and the summits of the Livingston Range that marked the Continental Divide down the center of the park. Flanked on one side by the huge, almost vertical cliff called the Garden Wall, the green valley of Logan Creek provided the foreground of a stunning panorama of the Glacier high country. Thomas Vint began describing the effect that building 15 switchbacks up the valley would have on the foreground of the scene they were admiring. Vint felt that it would "look like miners had been in there" if they went ahead with Goodwin's plan. What they should do, he urged the director, was replace the series of switchbacks with a much longer (and more expensive) road that would be carved directly into the rock of the Garden Wall. The roadway would traverse along the steep face of the escarpment, gradually descending for 10 miles, until it could drop down to the road along McDonald Creek in a single switchback. If this relatively straight roadway could be benched into the sedimentary rock of the Garden Wall all the way down the valley, the scene below would be preserved completely untouched.

After this experience at Logan Pass, Mather brought Bill Austin – a young Bureau of Public Roads engineer he had met days earlier – up to Glacier for a consultation with Vint. The director wanted to know from an objective engineering standpoint whether Vint's alternative to Goodwin's route had any merit. This began a collaboration between the Park Service and the BPR that would be formalized through an interbureau agreement two years later. The agreement has been renewed in various forms to the present day. Soon after the consultation with Austin, Mather and Albright officially contacted the BPR in Washington in order to negotiate a preliminary interbureau agreement for work on the road.

Early in September, Frank Kittredge – a locating engineer in the BPR's San Francisco office – arrived at Glacier and began organizing survey crews. If the entire affair seemed rushed, it was because location and preliminary survey work would need to be completed (or nearly so) that fall if construction contracts were to be let in the spring of 1925. The crews worked continuously between September 15 and November 10, when the snow became too deep (they had already been working in up to three feet) to allow further work.

From the surveys, Kittredge devised three alternative schemes. Goodwin's 1918 survey was the first alternative. He pointed out all the shortcomings of the original plan, emphasizing its practical drawbacks: the hairpin turns would be clogged with snow late into the season, the road would be impossible to widen or modernize and would become obsolete, and the switchbacks would require turns with 50-foot radii and grades as high as eight percent. The series of sharp turns assured it would always be a "second-gear road . . . increasing the hazard and decreasing its efficiency." Kittredge also investigated a second route, at chief engineer Goodwin's request, which was a revision of the 1918 survey. This revised route still wound directly up Logan Creek Valley, but employed fewer switchbacks and turning radii were widened from 50 to 100 feet. This alternative would have cost significantly more than the first; but Kittredge concluded that any objections to the original route applied (to a lesser degree) to this revision of it.

Kittredge's third – and "strongly recommended" – alternative described the Garden Wall option that Vint and Austin had initially reconnoitered the previous summer. Since this third alternative "met the requirements more than any other," it was the only one actually surveyed by Kittredge the previous fall. The route descended from Logan Pass at an even six percent grade for 10 miles, following "the contour of the mountainside . . . for the entire distance from Logan Pass to a point below Granite Peak." There, a single switchback with a 100-foot radius brought the route to the elevation of the McDonald Creek portion of the road, which Kittredge suggested extending farther west along the stream valley. The sharpest curves of the route were on 100-foot radii for open curves and 200-foot radii for blind curves. Tangents (straight sections) of at least 40 feet intervened between curves. Kittredge felt that this route, unlike Goodwin's earlier survey, would "permit safe grades and curvature," would be "capable of future improvement," and would be kept free of snow for the longest possible season. Besides these respectably practical considerations, the engineer also allowed himself to add that the third alternative would "exhibit the grandeur of the park to the maximum." Realizing the additional expense involved in this recommended route, Kittredge offered several strategies for reducing costs, including estimates for alternative roadway widths between 22 and 28 feet. "Width of road," he noted, "is of less importance than grade or alignment." The roadway, he contended, could always be widened; the basic location of the road, however, could not be changed later without abandoning all work done to that point.

If Kittredge was trying to convince Mather, Albright, and the rest of the Park Service that Bureau of Public Roads engineers were worthy collaborators, he could not have succeeded more brilliantly. Superintendent Kraebel, who witnessed the heroic survey work in 1924, wrote Mather before the work was even finished, gushing that he found it difficult "to speak in anything but terms of superlative praise" for Kittredge's work. Kraebel feared that Mather

would hesitate to support the more expensive alternative that Kittredge now championed. Pointing out the advantages of the Garden Wall route, the superintendent wanted to assure him that "the new location is emphatically worth the increased cost, whatever it may be." Kraebel wanted the entire road budget for Glacier spent on the Transmountain Highway alone, in order to bid it out as a single, three-year contract that spring.

Vint appreciated the fact that the longer, straighter Garden Wall route gave "less views (especially close views) of the road itself . . . One might say it performs its work more silently." In his approbation of Kittredge's work, Vint completed his rebuttal of Goodwin's idea of spectacularity in road engineering. In Kittredge, Vint had found a worthy ally who could validate "landscape preservation" not only as good policy, but as good engineering, Vint's only criticism of Kittredge's 1924 survey involved relocating a short section of the road away from the shore of St. Mary Lake near the Going-to-the-Sun Chalets. Perhaps a small point, Vint wanted to preserve that corner of the lake from the direct presence of the road; he also knew that panoramic views of the entire lake would result from relocating the road to higher ground away from the shoreline. Kittredge, who understood Vint's concerns and goals for road construction, also was able to see the advantages of the relocation. The Bureau of Public Roads perhaps passed a test as well: recognizing the right of the Park Service landscape engineers to request the change, the BPR agreed to alter the alignment in the final location survey.

From the west entrance of the park, the first 20 miles of the road had been completed up McDonald Creek past its confluence with Avalanche Creek. From that point, Kittredge had surveyed a route of about 12.5 miles along the Garden Wall to Logan Pass. Proceeding east from the pass, the route dropped down about 8.5 miles to the road along St. Mary Lake. While meeting in Spokane, however, Kraebel, Kittredge, Vint, and the others had decided that it would be wise to concentrate available funds on finishing the west side of the road up to Logan Pass and to build it to the highest standards possible before committing funds to projects on both sides of the park.

As of spring 1925, 29 of the eventual 50 miles of the Sun Road had been constructed, all in the relatively low stretches on both sides of the Divide. The NPS knew that it had to find expert contractors with skilled crews for the high-elevation sections of the road. The agency opened bids for the 12.4-mile construction on the west side up to Logan Pass in June of 1925. This was the largest single contract the BPR had ever let, and it took four seasons to complete. The contract called for 480,000 cubic yards of general excavation, 1,600 cubic yards of tunnel excavation, 2,200 cubic yards of retaining wall and other masonry construction, 7,000 cubic yards of guardwall construction, and 14,500 cubic yards of surfacing. Snow sheds, detailed in the plans for the project, were later deleted from the contract. Tacoma contractor Williams & Douglas was awarded the contract for their bid of less than $900,000. W. G. Peters served as the resident BPR engineer for the three-year project. Park Superintendent Kraebel assigned a ranger who had been trained by landscape architect Vint to be present throughout the construction work. The ranger’s job was to ensure protection of the landscape and to make sure that fire prevention guidelines were followed.

Williams & Douglas worked on the project from several different locations at one time. Although the original contract had specified that no power shovels should be used, the contractors convinced the NPS and the BPR that this was unreasonable (the next lowest bid that did not include such equipment was almost $150,000 higher). Most of their segment was built using two steam shovels and one gas shovel, all with quarter-yard buckets. They used pneumatic jackhammers and consumed 490,000 pounds of explosives (just under one pound of explosive per cubic yard of material removed). The contractors had to use about 15 miles of construction trails and a tote road to haul supplies around incomplete sections of the road (a tote road up to the Loop and a cabin at Packer's Roost, on a spur road below the Loop, were built during this period). Williams & Douglas eventually established six construction camps along their 12.4 miles of the Sun Road. Camp One was at Logan Creek, and this served as headquarters for the contractors and also for the BPR engineering crew (this camp was also used by later contractors). There, they had an office/supply cabin, a mess hall, and tents to sleep 50-60 men. The other camps were at the Loop, three places along the Garden Wall, and at Oberlin Bend. The camps were supplied from Logan Creek by pack string until 1927, when enough of the roadbed had been established so that trucks could get through to the camps.

An average of 225 men worked for Williams & Douglas during the construction seasons. Many subcontractors took on specific aspects of the project, such as sections of masonry retaining and guardwalls or drilling, blasting, and excavating through a specified section of stations. Station gangs working on the Williams & Douglas contract were paid by the cubic yard of material they moved. They accomplished about 38 percent of the excavation; the three power shovels did the rest. The hand labor was formidable; sometimes, for example, it took six men with crowbars to move one rock. One subcontracting crew was composed of sixteen Russians who were based out of "Russian camp," the construction camp at Oberlin Bend. Besides the power shovels, other machinery used on the contract included four gas locomotives with two cubic-yard dump cars that ran on 24-inch-gauge track (used for hauling and dumping broken rock); six portable compressors; one Fordson tractor; two team graders; and various trucks, teams, and wagons. Jobs as laborers were not easy to come by during the Depression, so Sun Road construction workers had to put up with the sometimes difficult working and living conditions or risk being fired.

The work on the Williams & Douglas contract began with the engineering crew marking the route. Then the contractors cleared the right-of-way, falling trees and removing stumps and roots. The cleared timber was used as fuel at the construction camps or at the rock crusher plants. Men trained in explosives broke up the rock, often hanging from ropes to drill the blast holes. Pack strings hauled in supplies until a 12-foot roadway had been cleared so that heavy equipment could be brought in to the job sites. Power shovels cleared and loaded the debris into trucks or ore cars pulled by a gas locomotive that hauled the rock several hundred feet to designated locations. Then the rock bed was surfaced and any masonry work was completed. Subcontracting station gangs of eight to ten men did most of the masonry work, including bridges, culvert headwalls, retaining walls, and guardwalls. The Williams & Douglas contract was completed in October 1928, more than a year later than originally anticipated. The delay was caused by an addition to the contract requiring reconstruction and improvement of the Mount Cannon section along Upper McDonald Creek.

In June 1929, the Sun Road opened to tourist travel between West Glacier and Logan Pass. That year, 13,983 automobiles entered Glacier, which represented a 46 percent increase over 1928. Park planners discovered that they had to devise a way to confine traffic at Logan Pass to protect the "flower fields" there, because motorists could drive several miles on the summit by "dodging cliff out-croppings and clumps of timber." Assistant landscape architect Ernest Davidson, in cooperation with Glacier's superintendent and engineer, worked out a solution on the ground. He had temporary movable cedar post-and-rail installed in a few critical places to define a parking area in June 1929, about the same time that the road opened to the public.

The NPS was generally pleased with the work of Williams & Douglas. Frank Kittredge did, however, complain that too much excavated material had been cast over the side of the road rather than dumped in specific gulches, leading to destruction of vegetation and to a shortage of fill material. Ernest Davidson documented the destruction of hundreds of trees caused by boulders rolling downhill.

Construction of the remaining stretch of road on the east side was less challenging technically than that on the Garden Wall section of the west side. In 1929, the new BPR resident engineer, A. V. Emery, began resurveying the east-side approach to Logan Pass. In August 1930 the park advertised for a contract to clear a segment running 10.5 miles east of Logan Pass. The construction work was divided into two contracts going from Logan Pass to about two miles east of Sun Point where the 1924 contract had ended. A. Guthrie & Company of Portland, Oregon, and Colonial Building Company of Spokane were awarded the two contracts, and Colonial subcontracted more than half their road length to A. R. Douglas. Grading and construction began in 1931 and continued through 1932 (Guthrie actually completed their portion July 7, 1933). The work included the East Side Tunnel, a spur road to Sun Point, and the construction of the Baring Creek Bridge.

The Sun Road contractors faced many unusual challenges in building the road. The work season was only about seven months long, and it started in the spring with the laborious removal of snow from the construction camps and roadway. They had to bench much of the road into sheer cliffs, requiring workers to hang from ropes in the early stages of construction. Snowdrifts, extreme weather, and even bears searching for food in the construction camps made the work more difficult. The west-side contractors left their heavy equipment up high on the road in safe areas over the winters because it took so long to walk the equipment down. When the workers returned in the spring, corrosion of the machinery made it difficult to get the equipment working again. On the east side, access to the work sites was a problem for both of the 1931-32 contractors. Douglas had to float heavy machinery and other equipment on a barge up St. Mary Lake to reach the construction site (and rough water often delayed the operation by several days). There was a 250-foot elevation difference between the dock at Roes Creek and the right-of-way, and Douglas had to build a 1,000-foot tote road to connect the two. Sand and gravel for concrete work on the lower section came from the shore of St. Mary Lake, but it had to be trucked from Kalispell for the upper section. Colonial had to build a trail above the road from Logan Pass to Lunch Creek Camp for hauling supplies. Because power machinery such as shovels and dump trucks could not reach the East Side Tunnel site, laborers had to load

all debris excavated from the East Side Tunnel into ore carts and dump it over the edge of the cliff. The Sun Road opened to travel over Logan Pass from both directions in October of 1932.

The parking area at Logan Pass was completed in October 1932. Back in 1925, Thomas Vint had commented that the amount of ground at Logan Pass used for the road should be minimized so that the "native soil will be the predominating note in the landscape rather than that of road surface." In accordance with this idea, the NPS directed the workers to do as little grading as possible at the pass. Because the cuts were mostly in rock, workers had to sort and cross-haul the waste material and also borrow fines along the roadway in order to have enough fine material to cover the fill areas. Cut slopes in earthen material were flattened to conform to existing surface slopes or were rounded at the top to help with seeding. Cars were prevented from driving outside the defined parking area by "log-type protection rail," masonry guardwall, and embedded boulders.

The full 50 miles of the Sun Road officially opened to the public July 11, 1933. Four days later, Glacier hosted a well-attended ceremony to dedicate the Sun Road at Logan Pass. Park cooks prepared a chili lunch for 2,500 people but ran out of food because over 4,000 people attended. Various dignitaries from the United States and Canada spoke, including politicians and representatives of the NPS, BPR, Montana State Highway Commission, and the Blackfeet, Salish, and Kootenai tribes. A plaque honoring Steven Mather was placed at one of the entrances to the parking area.

The transmountain road that Albright and Goodwin had estimated at about $600,000 had cost over $2.5 million. But it was, according to a proud Superintendent Scoyen, "the most beautiful piece of mountain road in the world." Among the crowd that July afternoon were hundreds of CCC recruits who had just arrived that summer and were busily setting up no less than eight of their camps in the park. Their presence was a reminder that Going-to-the Sun Road had not really been completed. Even while construction had continued on the Logan Pass portions of the road, plans had been underway for major reconstruction projects. A series of new bridges, wider travel lanes, and improved surfacing were already envisioned, especially for the Lake McDonald and St. Mary Lake sections of the road that had been built before the Bureau of Public Roads had introduced its standards for width, curvature, and culvert design. After 1933 Franklin Roosevelt's New Deal, which the crowds of CCC boys represented, would subsequently be the source of another $1 million for the reconstruction of the Glacier road. By 1937, the entire road had been improved to Bureau of Public Roads standards and contracts were being prepared to cover the crushed stone base courses with asphalt pavement. The final section of pavement was finally poured in 1955.

The first phase of reconstruction projects took place between 1929 and World War II. When the Sun Road was officially opened to the public in 1933, park administrators still considered the road far from "completed." Some reconstruction work on the Lake McDonald section to bring that section up to higher standards had already been done, but extensive improvements still needed to be completed on other sections. The road was graded to a 24-foot width and was gravel surfaced to 22 feet; curvatures and grades were reduced; some segments were realigned; drainage was improved; masonry retaining walls, guardwalls, and culvert headwalls

were constructed; slopes alongside roads were rounded and stabilized; through cuts were daylighted; wooden guardrails were installed; pullouts were developed; log bridges were replaced by masonry structures; and all but ten miles of the road received either bituminous chip-seal treatment or bituminous pavement. Much of the reconstruction work was done with financing from public works programs and with laborers supplied by the Civilian Conservation Corps.

As in later years, these initial reconstruction programs occurred simultaneously with site specific repair projects necessitated by avalanches, rockfall, and other road failures. One of the earliest known emergency repairs to the road occurred in 1930 and 1931, when NPS crews replaced a failed dry-laid retaining wall built in 1924 near Red Rock Point (about a mile above Avalanche Creek) with a retaining wall with guardwall conforming to design standards adopted during the Williams & Douglas contract. This was the first "wet wall" masonry constructed on a section of previously built road. The workers had to dig down 22 feet to reach a solid rock foundation for the wall. The sand was shipped from Kalispell to Belton by train and then hauled to the construction site. The wall contained about 150 cubic yards of masonry and was 74 feet long. Two masons and two helpers laid the wall, while one man mixed mortar and three men lowered rock to the masons with a hand hoist. In 1933, the NPS had to replace a failed log cribbing about one mile above Avalanche Creek. The 575 feet of cribbing along the creek edge was up to 20 feet high. About 200 feet of the cribbing and road gave way in June of 1932 and slid into Upper McDonald Creek. A temporary timber half-bridge made the road passable in time for the June 15 opening. Then that fall and the following spring, a dry masonry wall was constructed to replace the cribbing. More subatantive reconstruction work on the west side began in 1931, with the most extensive projects taking place between 1934 and 1937. The period was highlighted by a series of construction contracts that saw a near-total rebuilding of the road from West Glacier to about a mile east of Logan Creek.

In 1926 and 1927, resident BPR engineer W. G. Peters had made several recommendations for improvements to the Belton-to-Avalanche section of the Sun Road, and these served as guidelines for early 1930s work on the Lake McDonald section. The recommendations included reducing curves, widening narrow sections, installing wooden guardrails on sidehill sections, and placing surfacing material over the foundation. When the road had been built along Lake McDonald in 1921, several sections through rock were constructed with only a 12-foot-wide roadway because of insufficient funds. These narrow sections could accommodate one-way traffic only. They were widened during a project to improve this stretch of the road in 1930 and 1931. Also, the early construction of this stretch had not provided for cut-slope stabilization, and drainage provisions were only minimal (narrow roadside ditches, wooden culverts, and wooden bridges). Every year through the 1920s, sloughing and spring mudslides created problems along this stretch of the road. NPS-supervised day laborers did the 1930 and 1931 reconstruction work on the 12-mile Lake McDonald stretch of the road. They realigned the roadway on curves of standard radii of 150 feet or more and gave it a width of 22 feet on the cuts and 24 feet on the fills. The quantities of material in adjacent cuts and fills were balanced as much as possible to avoid long hauls by dump trucks. In some places, the widening was accomplished by casting material with the park's gasoline shovel from the upper side to the lower side of the road.

One area that was widened significantly to provide parking spaces and a viewpoint was at McDonald Falls, thus meeting a "long-felt need." Steep road cuts with overhanging tops that sloughed away each spring were sloped. Curves were superelevated. The old roadway was obliterated in one place and was then planted to shrubs, trees, and grass. About 28 deteriorating or failed wooden culverts were replaced with corrugated iron culverts with masonry headwalls, and headwalls were placed on other earlier iron culverts. In the fall of 1934, representatives of the NPS Landscape Engineering division, the resident BPR project engineer, and Superintendent Scoyen agreed on guidelines for reconstruction of the Lake McDonald section. These were: reduce curvature, hold centerline of new road on present roadway width wherever possible; eliminate a number of short vertical curves; retain long vertical curves where no traffic hazard was involved; obtain additional width by filling present grade with borrow materials from the lake; cut back slopes to obtain width only when no other method is practicable; and depart from conventional balanced cut-and-fill practice by using lake borrow (in the end, borrow material came instead from the Jackson Creek pit). Ernest Davidson, the resident landscape architect, strongly recommended making a safe road "without destroying the charm of the present roadway, its winding, woods-road atmosphere."

The NPS became interested in treating the slopes of park roads in the late 1920s and early 1930s. This coincided with a growing interest nationally in planting highways for scenic beauty. Along Lake McDonald, slope treatment standards established in the 1930s specified slope ratios and required the rounding of slope tops. Slope stabilization work during the 1930s along the Sun Road included paving unstable cut slopes with flagstones, rounding slopes, placing brush mats on slopes, digging surface drainage ditches on the hillsides above the slopes, paving culvert inlets to prevent culverts from getting plugged during spring runoff, installing perforated pipe in the slopes, placing log lattices on slopes, and planting willows on slopes. Laborers walked behind the park shovel, removing projecting roots and other debris and finishing the tops of banks and slopes. These were later planted with a mixture of Kentucky bluegrass and clover "to add to their beauty" and to protect them from erosion. (In 1930, the NPS banned all exotic seeds and plants from the national parks except for non-native grasses, which already were in abundance.)

BPR engineer Peters recommended two significant roadway realignments. The first was designed to bypass the Lake McDonald Lodge developed area. The second was to construct a new road south of Lake McDonald to tie in to a new crossing of the Middle Fork of the Flathead and bypass the Apgar developed area. Resident BPR engineer A. V. Emery surveyed both of these extensive realignments of the Sun Road in 1934 and 1935, and they were built in the 1930s.

Williams & Douglas, which had constructed the higher-elevation west-side segment of the road, was awarded the 1936-37 contract to reconstruct 11 miles of the Sun Road. This contract went from the north approach of the new bridge at Belton, including the new west entrance station and two miles of realignment at the Middle Fork, plus the new section bypassing Apgar (the "Apgar cut-off"), up to and including the Lake McDonald Lodge realignment. The contractors established their camp near Apgar in the vacant, government owned Gold Bungalow. Because

of the relatively heavy tourist traffic, the contractors tried to save for fall the sections in which the construction work would interfere with traffic. On this contract, less than one-quarter of the work hours came from relief labor; this was a decline from earlier contracts during the Depression.

The road that serves today as the access loop to the rear of Lake McDonald Lodge was originally (built in 1921) the main alignment of the Sun Road. The section to the north was realigned ca. 1933. The current alignment of the Sun Road east of Jackson Creek, which bypasses the hotel, was built between 1936 and 1937 under a contract awarded to Williams & Douglas. As a result, about half a mile of the Sun Road was relocated 1000 feet to the east. The contract specified landscaping details such as log and boulder curbs, masonry flagstone steps, and terrace boulders. The old store at Lake McDonald Lodge (the original Snyder hotel) had to be moved because of the 1933 road realignment, and it was dismantled a few years later. Great Northern Railway architect Thomas McMahon designed a new general store for the lodge in 1937, and this building is still in use today.

The contractors also created a large parking area that NPS landscape architects described as a "wide mall which would function as a parking area and landscaped approach to the hotel, creating a front-door impression to what is really the back of the hotel." Balconies were added to the rear of the hotel. Several options were considered for constructing a grade separation where the new highway would cross the Great Northern tracks at Belton. Among the routes considered were alignments that went through the existing park Headquarters area and ones that bypassed it to the west. Planners also considered an overpass near the depot. NPS landscape architect Ernest Davidson urged the Montana State Highway Commission to make the bridge as attractive as possible, and he showed the state representatives drawings of the St. Mary and Lee Creek bridges as examples. The NPS hoped to keep the residential and utility areas of park Headquarters off the main highway, as they were with the new alignment, but to build a new administrative building at Belton. Belton residents, in turn, did not like any proposal that detoured around or involved a bypass over the existing town.

The new alignment of the Sun Road in the West Glacier/Apgar area tied in with the new underpass built by the Great Northern Railway, BPR, and Montana State Highway Commission at Belton in 1937. The Highway Commission put in a new concrete bridge over the Middle Fork, replacing the 1920 bridge farther upstream. This bridge received national recognition as the most beautiful bridge of its class built in the United States in 1938 (it was replaced in 1965 after it was damaged by the 1964 floods). The waste material from the underpass was used to build up the north approach for the new bridge. Once the bridge was constructed, the Belton Mercantile complex moved to its present site south of the bridge. The railroad depot was moved about 800 feet west and was remodeled, enlarged, and stained to blend with the Belton Chalet buildings.

Williams & Douglas also built the new road in the Apgar area. This road ran directly from Belton to the east shore of Lake McDonald without passing through Apgar. This alignment was completed in 1936 but was not put into use until the new bridge across the Middle Fork was completed in 1938 (and the old alignment, which led directly to Apgar, was not immediately

obliterated). Year-round residence at Apgar peaked in the 1930s. Despite the 1938 rerouting of the Sun Road to bypass the community, summer trade there increased.

Early visitors to Glacier passed right in front of the rustic-style administration building and employee housing fronting the original Sun Road alignment, just above the Middle Fork. Over the years, NPS philosophy changed to the belief that man-made resources within parks should be screened from view whenever practical. The 1938 realignment of the Sun Road to bypass Headquarters accomplished this goal for the west entrance of the park. From an engineering perspective, the new road alignment also provided a more suitable location for the Middle Fork bridge crossing.

Between 1934 and 1937, the NPS awarded four major contracts for reconstruction work on the Sun Road's west side. The first, given jointly to the Tomlinson-Arkwright Construction Company and J. L. McLaughlin of Great Falls, was a 1935-36 project beginning at Avalanche Creek and extending eastward for 5.6 miles. The contractors were based out of the old Williams & Douglas camp at Logan Creek. The contract included reconstruction grading and surfacing, building a small amount of culvert headwalls and retaining walls, eliminating sharp blind turns and narrow stretches, and deepening and widening ditches to provide ample drainage. On this contract, the clearing and grubbing line was designed to weave in and out, eliminating "the narrow, deep swarth [sic] of cutting through the timber." The rock excavation was quite difficult because of large boulders and hard ledge rock that did not explode in a predictable manner. Trees were damaged during the work, and the larger scars were hidden with paint. The road was surfaced with two layers of crushed rock taken from a gravel pit 500 feet south of the road and about 2,000 feet west of Avalanche Creek.

The second reconstruction contract of this period on the west side was awarded to Martin Wunderlich, a contractor from Jefferson City, Missouri. The 1936-37 work covered the 5.5-mile section of road between the Lake McDonald Lodge and Avalanche Creek, and the contractor's camp was along McDonald Creek. Included in the contract were eight realignments (totaling about 1.75 miles), drainage pipes, crushed-rock surfacing, retaining wall, Type IIA masonry guardwall, Type 7 wooden guardrail, and the horse trail underpass above the head of Lake McDonald. In some areas, such as at McDonald Falls, masonry wall foundations were reinforced by removing loose ledge rocks, flushing out cavities, and then mortaring or grouting the original rocks back into their original locations. Wunderlich, like other contractors, had trouble hiring enough masons. Even so, the masonry work done on this contract displays fine workmanship. In comparison with the Type IIA masonry guardwall built under other contracts, the Wunderlich masonry is more substantial and formal in appearance. The guardwalls have more uniform stone size, a larger average stone size, a greater regularity in stone shape, a larger proportion of stones of full-wall width, and a greater average length to height ratio for individual stones. Wunderlich, like Yonlick, lost money on the project.

W. K. Trippet won the contract to build the two Snyder Creek bridges and the Avalanche Creek Bridge. The Snyder Creek bridges (on the main road and on the loop access road) are nearly identical. Both are single-span concrete-slab bridges with stone abutments and portals and masonry arch facades. Curbs, railing, and hand-laid riprap along the creek's banks were

included in the project. The Avalanche Creek Bridge has three spans, and it replaced a log bridge constructed in 1923 by Laux & Gardner. The rock for the bridges came from the cliffs near the Haystack Creek culvert (near Bird Woman Falls overlook). The sand and gravel was brought in from towns outside the park. Trippet also subcontracted to build large culverts and the horse trail underpass for Williams & Douglas and for Wunderlich. Trippet's camp was near the Avalanche Creek Bridge, and it included an office, bunkhouse, cookhouse, blacksmith shed, and warehouses.

Chris Yonlick of Seattle was also awarded a 1933-36 contract for work on the west side. It included constructing masonry retaining walls and guardwalls from a point about one mile west of Logan Creek up to Logan Pass to supplement those built under the 1925-28 Williams & Douglas contract. Yonlick opened up a quarry near Haystack Creek and later moved to one 400 feet west. The sand for the mortar came from a pit north of Coram. The contractor found the rock from both quarries brittle and difficult to work. He also found that there were not enough experienced masons available, forcing him to rebuild much of his newly completed masonry. The guardwall was much more difficult to build than the retaining wall because of the additional shaping required. During this project, traffic on the Sun Road was delayed approximately 25 minutes at the quarry and 10 minutes wherever the masons were working. The job was completed in 1936 after Yonlick became insolvent and his bonding company took over as his agent.

The first contract for east-side reconstruction work was let in 1933 to contractor Archie R. Douglas. This covered the 7.1-mile segment from the St. Mary River to Dead Horse Point, and it included construction of a bridge over Roes Creek and some masonry retaining wall and guardwall. Stone for the masonry work came from excavations at the Golden Stairs under the same contract. By this time, the alignment of the roads in the St. Mary area had been under discussion for a number of years. When the east end of the Sun Road was first constructed in the 1920s, travelers turned off the Blackfeet Highway (Highway 89) onto a spur road to the St. Mary Chalets in order to access the Sun Road. In 1930, NPS Chief Landscape Architect Thomas Vint suggested that a primary junction between the Sun Road and the Blackfeet Highway that bypassed the St. Mary Chalets should be built.

In 1934, the NPS and BPR let a contract for the realignment of the intersection of the Sun Road-Blackfeet Highway intersection at St. Mary, a project that also included the construction of new Sun Road bridges over the St. Mary River and Divide Creek. This work created the wye intersection at St. Mary that is still in use today. The Lawler Corporation of Butte, which was already working on another east-side contract, submitted the low bid. Their 60-person camp for this project was near the bridge, as was their stockpile of sand, gravel, and stone. The proposed wye in the road was outside the park boundaries, so the work was delayed while the NPS obtained the right-of-way and appropriation for that part of the work. As part of the project, the turnouts around the east-side entrance station were enclosed by wooden guardrail.

The new St. Mary River Bridge replaced a utilitarian pony-truss span that was felt to conflict with the rustic design philosophies evidenced elsewhere on the road. The 1934 bridge was built by highly-skilled teams of Italian stonemasons, as was much of the masonry guardwall

elsewhere along the road itself. The sand and gravel for the project came from river bars located about 0.5 mile below the St. Mary Bridge site, and the rock was carefully selected for color, texture, and weathered faces from along the road near Piegan Creek. The rock is a mix of buff limestone with individual green stones spread randomly throughout the walls, piers, and abutments. The contractor built the wooden falsework, laid the ringstones on the edges of the timber frame, and then poured the entire concrete slab floor in one 17.5-hour period. Crews finished the bridge in 1935 by constructing the railings, curb stones, and surfacing. On the upstream side, the piers have masonry nose cones ("cutwaters") to deflect ice and debris.

The Divide Creek Bridge was an unusual project on the Sun Road because half the bridge lies outside the park boundary. But, the design of the bridge conformed to the specifications of other bridges along the road. In order to build the three-span bridge, the contractor had to use a gas shovel to change the channel of the stream 350 feet upstream and 300 feet downstream. He then poured the footings, built the falsework, installed steel reinforcing bars, and poured the slab. Then the workers completed the masonry and applied a crushed rock surface to the bridge roadway. As part of this contract, Lawler also installed drainage pipes and Type 7 log guardrails. The Lawler contract on the east side included crushed-rock surfacing of the road from Logan Pass to St. Mary, along with surfacing the parking areas at Logan Pass and Sun Point and the spur road to Sun Point. Some masonry retaining wall and guardwall was also built under this contract, probably including the curving guardwalls with matching stone curbs at Sun Point. Most of the guardwall was built on fills created by earlier grading projects, including a long stretch of guardwall above Siyeh Bend at the Piegan Creek crossing. The design standards for this work were the same as for the Yonlick contract. The contractor set up a 125-person camp at Roes Creek. Laborers lived in tents, and the supervisors and shovel operators lived in cabins. The first quarry selected for this contract by the Landscape Engineering division was located about halfway between Sun Point and Roes Creek. The road gained a 30-foot parking area using material from this quarry, and the curve where the quarry was located was reduced.

Much of the reconstruction work on the east side involved heavy rock work and blasting. NPS landscape architects were on-site frequently, and they wrapped vulnerable trees in burlap to protect them from the blasting. One shovel oiler recalls that the shovel operator was allowed to cast rock off the road any place that was convenient, saying, "We would balance [a rock] on the end of the bucket and kick it over and watch it go banging down." NPS and BPR representatives continued to work closely with contractors doing the reconstruction work. They inspected the job sites frequently to make sure that the contract specifications were being met, including those related to protecting the scenery. Forest Farris, who worked for both A. R. Douglas and Tomlinson-Arkwright, remembers that the BPR engineers were "real fussy" about protecting the landscape. They restricted large blasts so that rocks would not fly into the lakes, but workers were allowed to drop large rocks over the side of the road. He remembers that all culverts had to be laid in place at a certain grade so that the water would flow at just the right rate. "I tell you, there was more measuring sticks out there than you can shake a stick at!" The BPR (Farris does not remember NPS landscape architects or engineers on-site) had men at rock quarry sites and at the scales where crushed rock was being quarried, and he felt they were quite "stiff-necked" in their inspections. The contractors, according to Farris, used choice words to describe the requirements imposed by the BPR. But, they had to comply.

Farris recalls that A. V. Emery and others with the BPR selected the rock to be used in the masonry features based on color and texture. The rock usually was quarried from a cut along the road. The stonemasons, too, were very particular about their rock. Most of the masons Farris worked with were immigrants from southern Europe who had learned their craft in their home country. Farris operated a mobile, gas-powered quarry crane. He routinely turned the rocks with the crane so the masons could inspect the seams in order to avoid putting in a day's work on a rock that ultimately would not be useable. He recalls, "Many a time you'd think you was going to wear a rock out turning it over for them." Laurence Staab worked on the Sun Road in the late 1920s or early 1930s. He recalled that one morning when he was plowing snow he "knocked the bark off 37 lodgepole pines, and knocked down a little fir." News of this incident reached the office of Montana senator Burton K. Wheeler in Washington, D. C. As a result, Staab had to return to the site to "patch" the trees and conceal the fir tree.

By the end of the 1937 construction season, the entire Sun Road had a crushed-rock surface. The surfacing materials were taken from talus slopes within the park and were crushed onsite. On the Lake McDonald section, for example, the surfaces varied from four to twelve inches in depth, depending on the subgrade conditions. The roadbed was 22 feet wide all along the road except for the ten-mile section west of Logan Pass, which had (and still has) more narrow sections. A typical ditch on the east side had a 24-30-inch rounded bottom, was 5 inches deep, and had bituminous surfacing. The next step in road improvement was paving the road with a bituminous treated surface with a chip-seal cover, which was accomplished by several contracts beginning in 1938 and ending in 1955. The first of these also included slope stabilization and drainage improvements. The first contract, awarded to Carl Nyberg of Spokane, paved 21.4 miles of the road from West Glacier to the Logan Creek area (1938-39). This contract resulted in a chip-seal bituminous surfacing comprised of a thin layer of hot liquid asphalt followed by a layer of small crushed rock, then another light shot of hot liquid asphalt as a seal. This was covered with a thin layer of rock chips, and then the whole mixture was rolled flat to ¾ inch. The material was taken from slopes along the road and was crushed on-site. The first 1.6 miles of this contract had a 26-foot roadbed, the widest on the road at that time. The second contract, awarded to S. Birch & Sons, paved 18.1 miles from Logan Pass to St. Mary in 1939 and 1940, with a minimum 20-foot roadway. No work of this kind was done during World War II.

World War II and a subsequent shortage of funds led to almost a decade during which no significant work on the road was completed except for routine maintenance. The second phase of reconstruction took place under one contract between the years 1950 and 1952 and then under a "final paving" contract in 1955. Back in 1933, Frank Kittredge had noted that the standard width that was adopted when the road was built allowed for additional width to be obtained by paving the ditch and providing a curb on both sides of the road to keep cars away from the cliffs and guardwalls. In the early 1940s, the BPR recommended widening the segment of the Sun Road between the Logan Creek area and Logan Pass to 24 feet throughout. The engineers felt this could be done by replacing masonry guardwalls with railings bolted into concrete on top of retaining walls and with the placement of a cast concrete curb on the outside of the road.

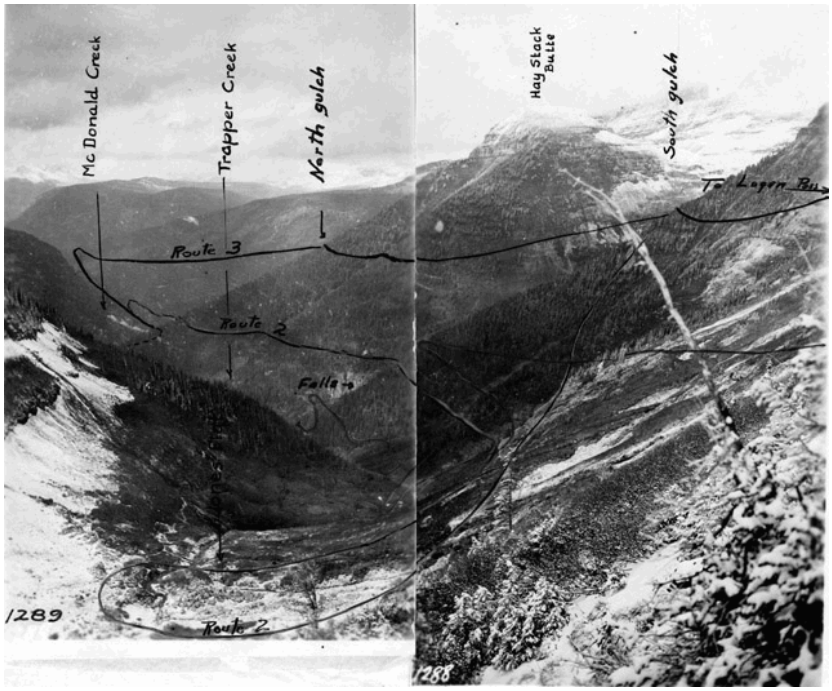
Planning for improvements on the Logan Pass section resumed in 1948. That year, a review of the work still required on the western ascent to Logan Pass identified the need for paving, masonry work, and several additional items. These included the construction of a parking area at the "algal colony" geologic site near the West Side Tunnel, restoring the water supply line at Road Camp 9 (this was the construction camp near Bird Woman Falls overlook known as Camp 5 during the Williams & Douglas contract), installing metal culvert pipes for drainage, and repairing damage to an existing wire net and brush mat slope protection. In areas where the road was benched into the cliff (precluding widening with fill), the 26-inch inside ditch was filled and paved in order to widen the road. In areas with fill embankments, material was cast over the side to increase the width of the roadway.

Morrison-Knudsen of Seattle won a 1950-52 contract to improve the drainage on the remaining 10 miles on the west side from Logan Creek up to Logan Pass. They also built and repaired retaining walls and guardwalls. The masonry work proved particularly difficult. The contract called for a new retaining wall at the Weeping Wall plus 150 cubic yards of masonry guardwall, including repair work, treating the ends of existing walls that would abut new removable guardrail, and new construction. Stonecutters and masons were flown in to the project from all over the country. A problem developed in that the rock obtained from the quarry at the Bird Woman Falls overlook often broke in two, sometimes when the mason was just about to finish shaping the stone. Engineers at the time felt that this was probably due to cracks in the limestone resulting from "overshooting" the quarry (using excessive explosive), making the stone unworkable. Until the 1940s, Sun Road contracts had called for "approved stones" but had never clearly prohibited the use of stone from outside the park. By the time of this contract, a clause stated that the stone should "preferably" be native. The contractor tried unsuccessfully to find matching stone outside the park.

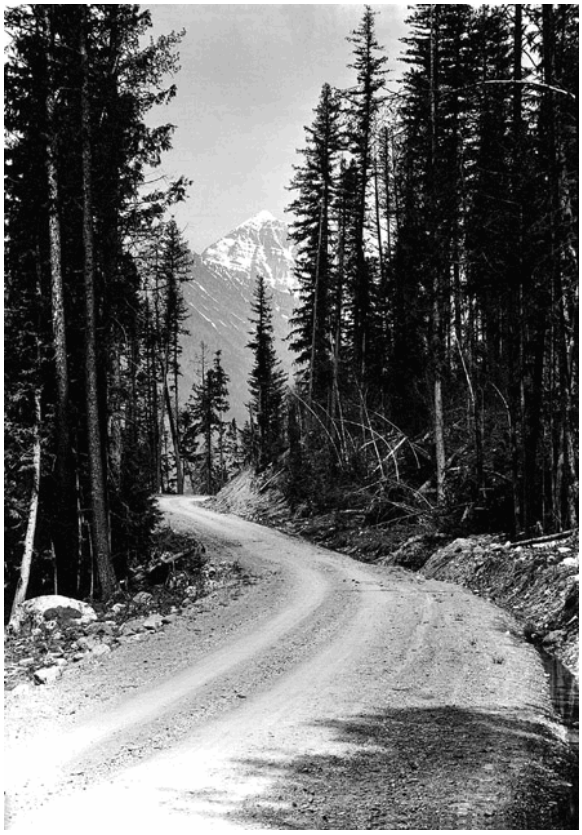
Eventually, the NPS arranged to import a dark gray granite from Minnesota to use in the Type II guardwalls, with a transition zone between the two types of rock. One retaining wall constructed of this Minnesota granite is located near the West Side Tunnel. Morrison-Knudsen also installed 1,600 linear feet of removable log guardrail along the road in locations prone to avalanches. This guardrail was constructed of 8-foot logs that were 14 to 20 inches in diameter placed on two 3-foot-long saddle "feet" that were 12 inches in diameter. Each log was given a light coloring that was close to natural in appearance. The contractor had to send some of his own employees to fabricate the sections at the log treatment plant in Drummond, Montana. But when installed, according to the BPR engineer on the project, they did not have a very good appearance. Some of this sturdy log guardrail lasted into the 1970s, but none exists on the road today.

The final paving contract for the Sun Road, completed by contractor McLaughlin, Inc., in the fall of 1955, included hot plant mix paving of the 10 miles between Logan Creek and Logan Pass plus drainage improvement, high scaling of dangerous rock cliffs, and road widening. This work marked the end of the series of reconstruction projects of the Sun Road that had been envisioned since at least the early 1930s. By this time, the estimated cost of the road came in at $4.25 million. The road was now completely paved in asphalt; its width in all but the Logan

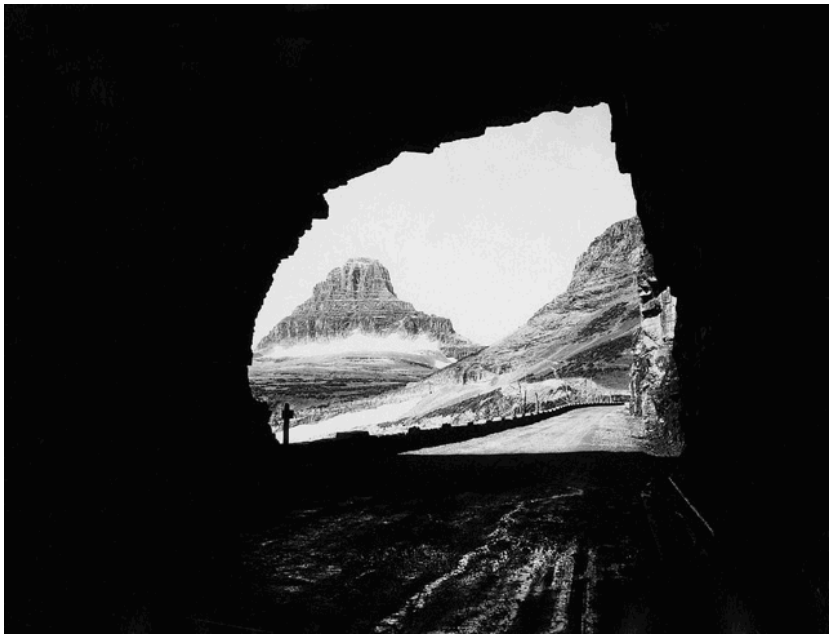
Pass section was at least 22 feet, and the masonry work – retaining walls, guardwalls, bridges, culvert headwalls – was complete. Removable guardrail had been installed in the areas most vulnerable to avalanches and rockfalls.



Photographs with three routes considered by Frank Kittredge in 1924, looking northwest from Jones Flat. (From Kittredge, Report to National Park Service, GNPA)

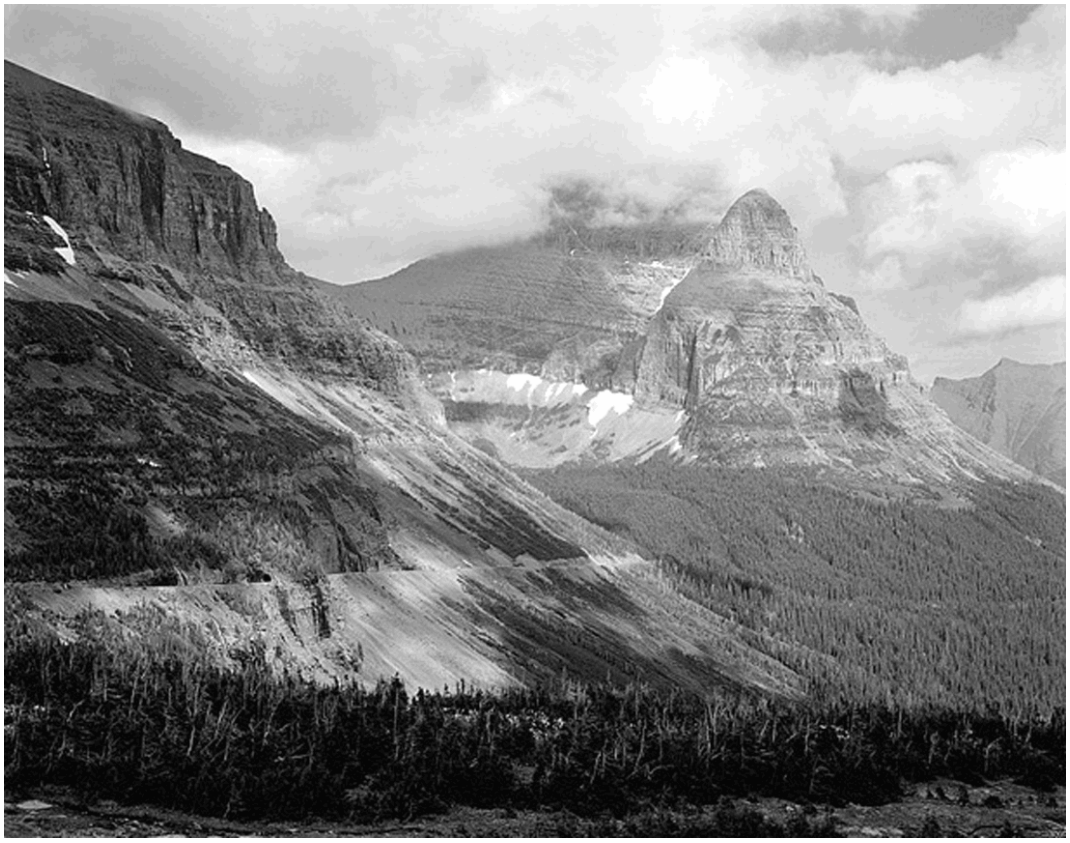


The Sun Road had a 'winding, woods-feel atmosphere' during the 1920s. Mount Vaught is visible in the background. (Photo by T. J. Hileman, GNPA #8069)

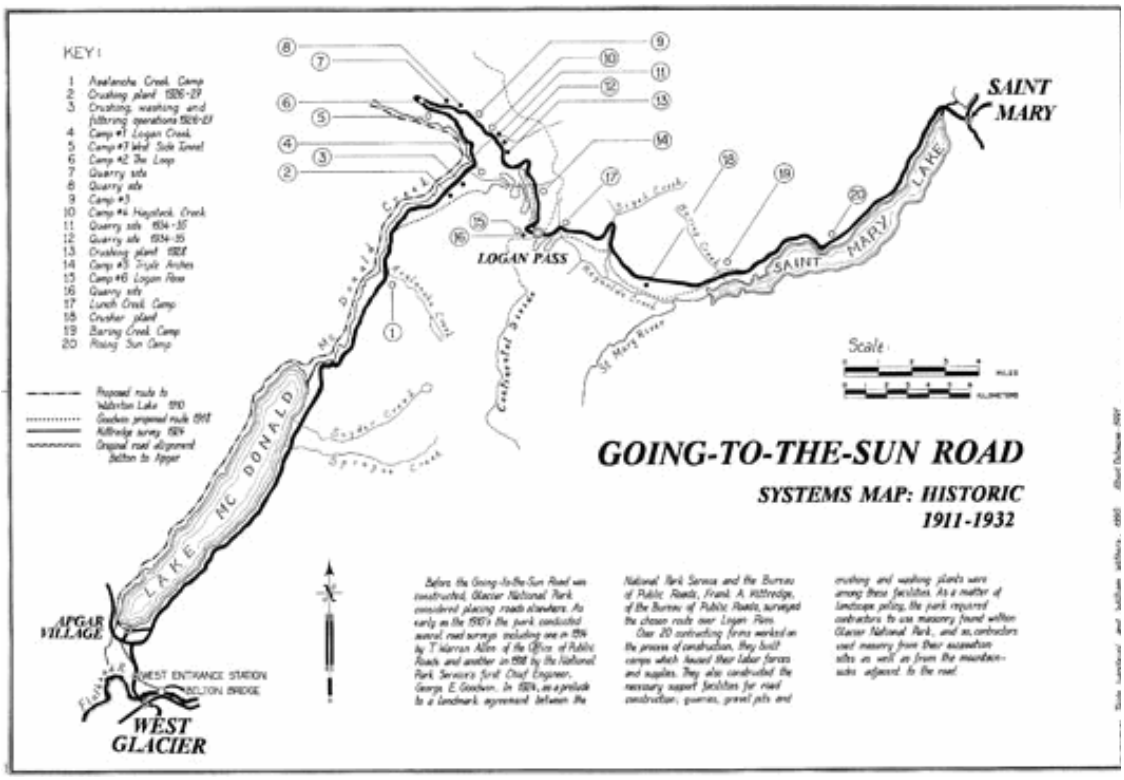


View of Clements Mountain from inside the East Side Tunnel, before the tunnel was lined with concrete. (Photo by R. E. Marble, GNPA #8327)

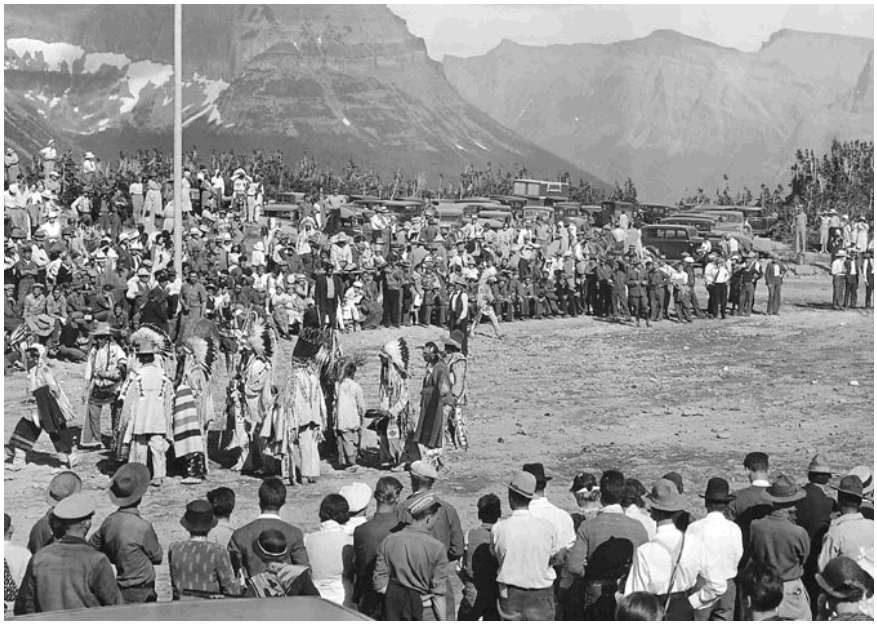
Tunnel and parapet on east slope of Going-to-the-Sun Road, with Clements Mountain in the background. July, 1933. Note the original gravel surfacing and Type II guardwall. (GNPA)



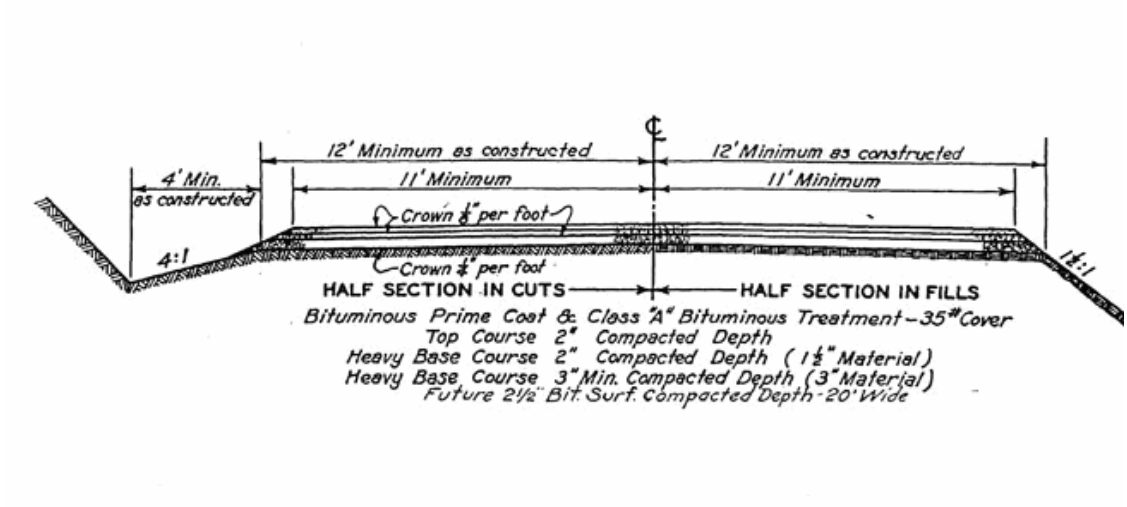
Rather than ascending steep hillsides with visually dominant switchbacks, Going-to-the-Sun Road winds along mountainsides in order to preserve scenic vistas. (HAER survey photograph MT-67-34)



Sites used in construction of the Sun Road, including camps, gravel processing areas, and stone quarries. Prepared for the Historic American Engineering Record by Tajda Ivanisevic, William Withers, and Albert Debnam in 1990 and 1991.

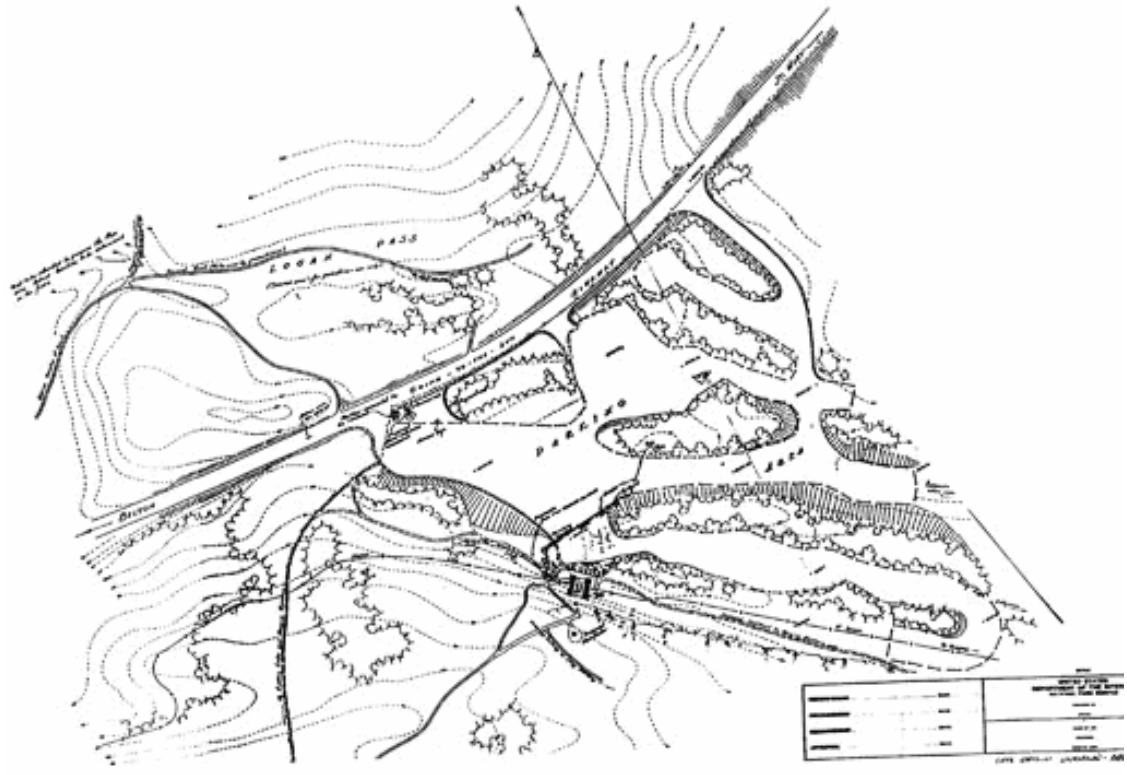


Members of the Blackfeet and Kootenai tribes staged a peace ceremony during the 1933 opening ceremonies. (GNPA #11424)

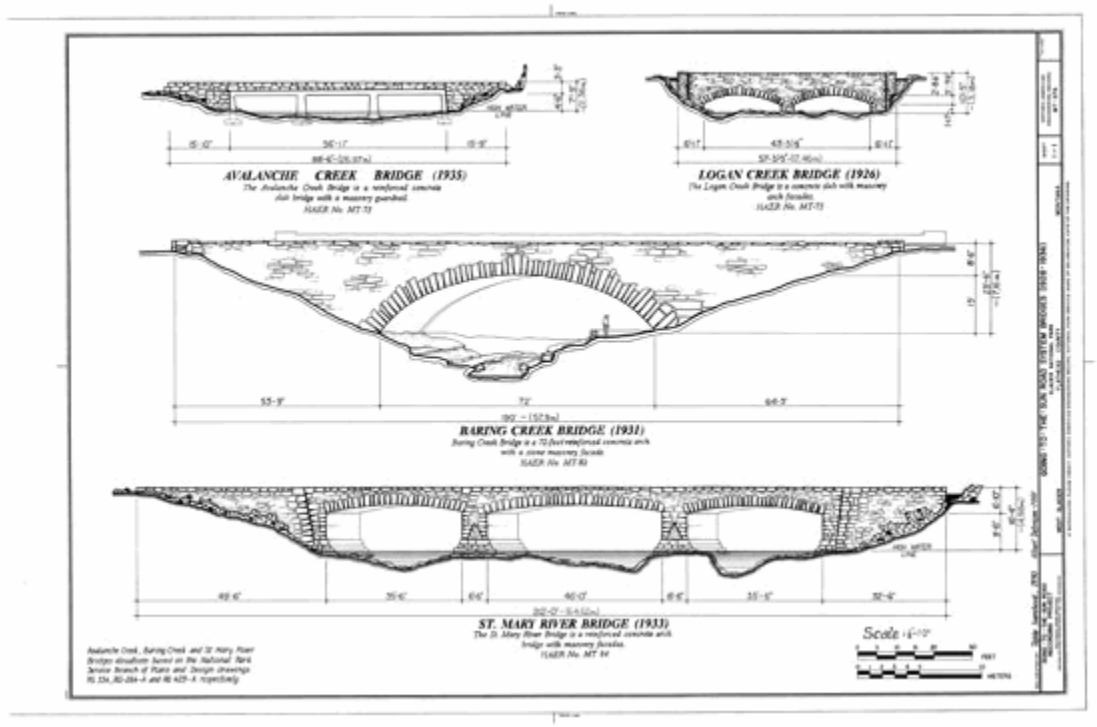


Typical road profile, as specified in 1937 paving contract. (TIC drawing 9163)

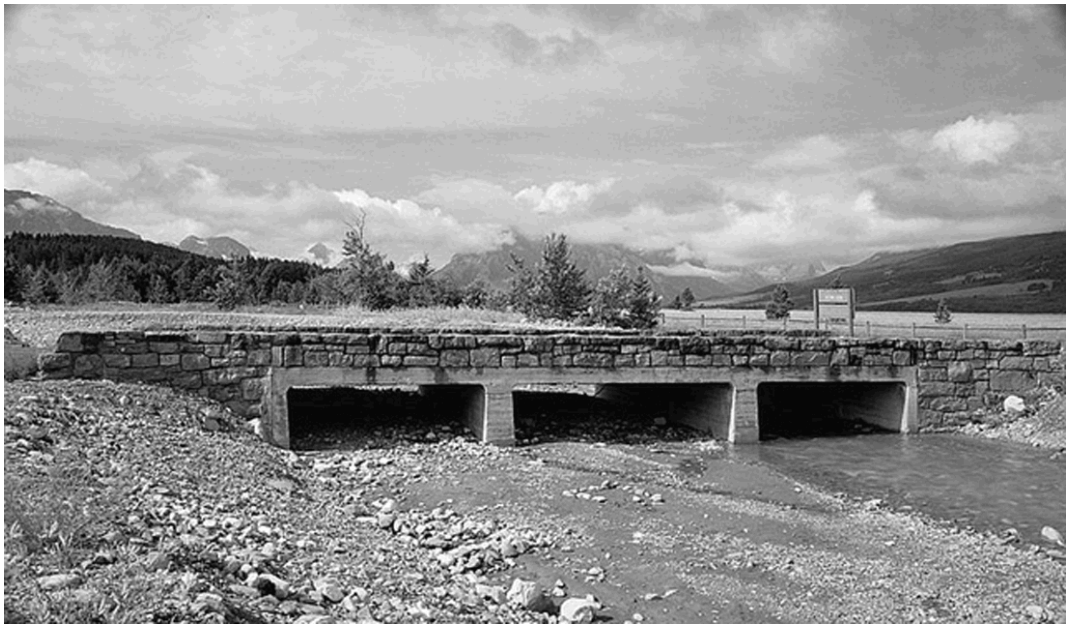
Parking area at Logan Pass, 1940. (GNPA photo #10096)



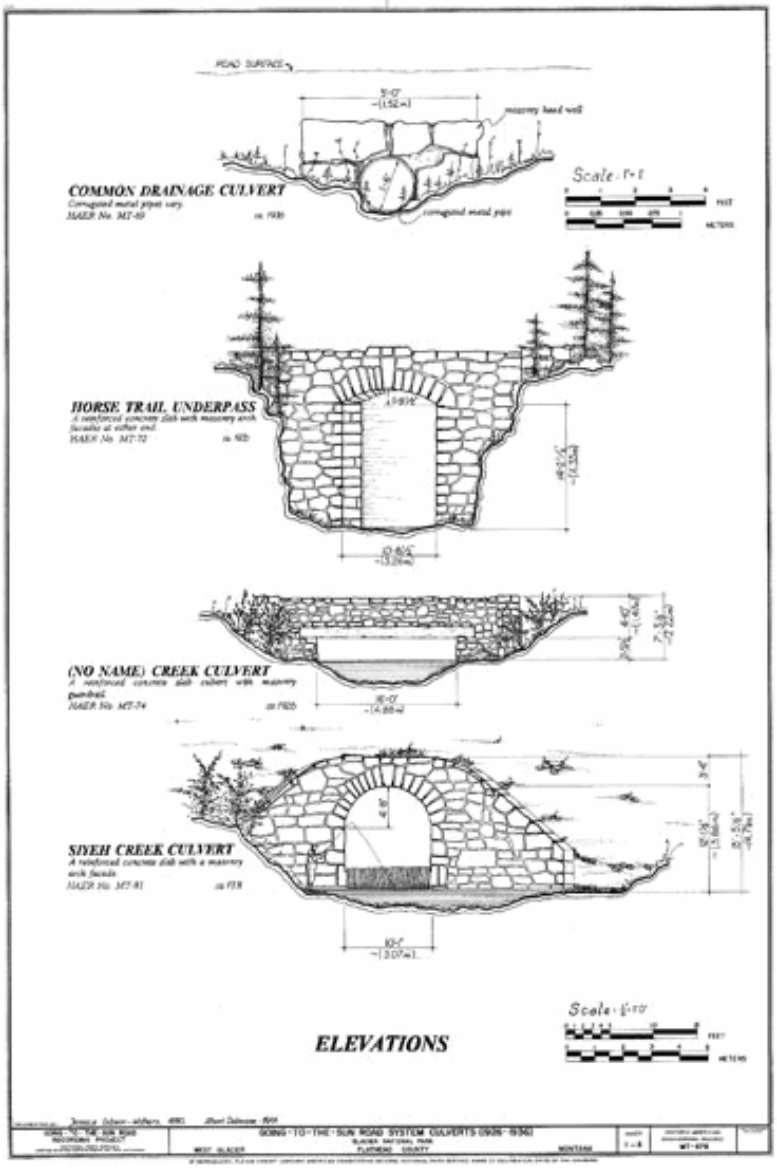
Plan of Logan Pass parking area ca. 1940. Note the irregular islands with vegetation between parking spaces. (TIC drawing 354A)



Construction details for several bridges along Going-to-the-Sun Road. (HAER survey MT-67)



Although half of the Divide Creek bridge (built 1934) lies outside boundaries, it conforms to specifications of other bridges along the Sun Road: reinforced concrete structural elements with masonry facing and guardwall. (HAER survey photograph 85-1)

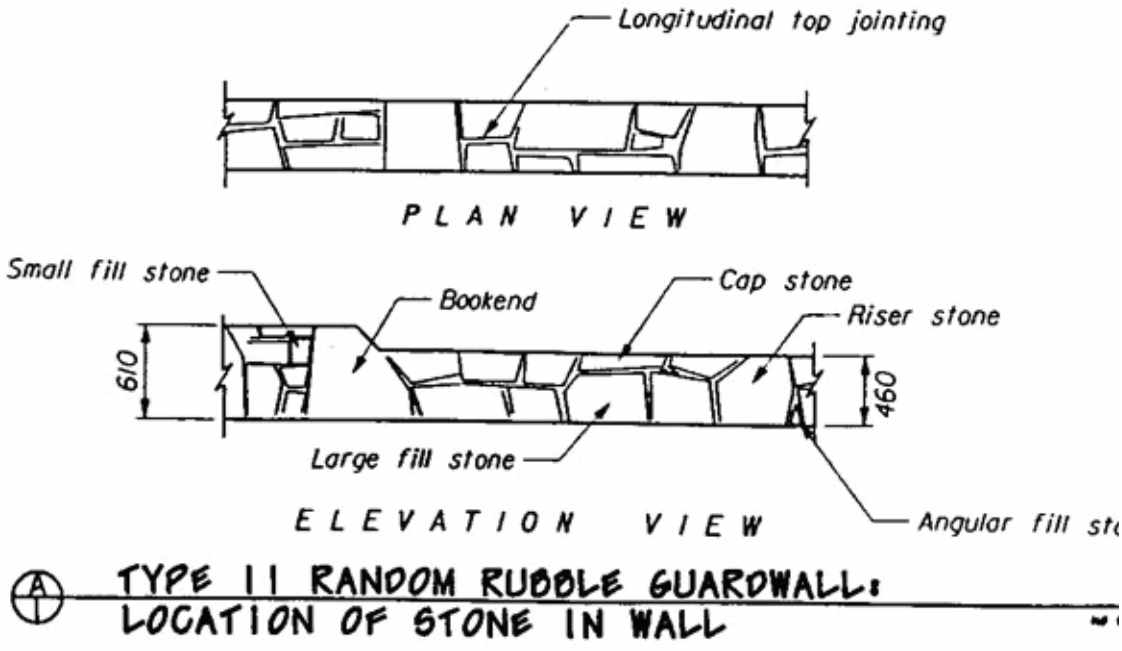


Details for culverts and underpasses along Going-to-the-Sun Road. (HAER survey MT-67).

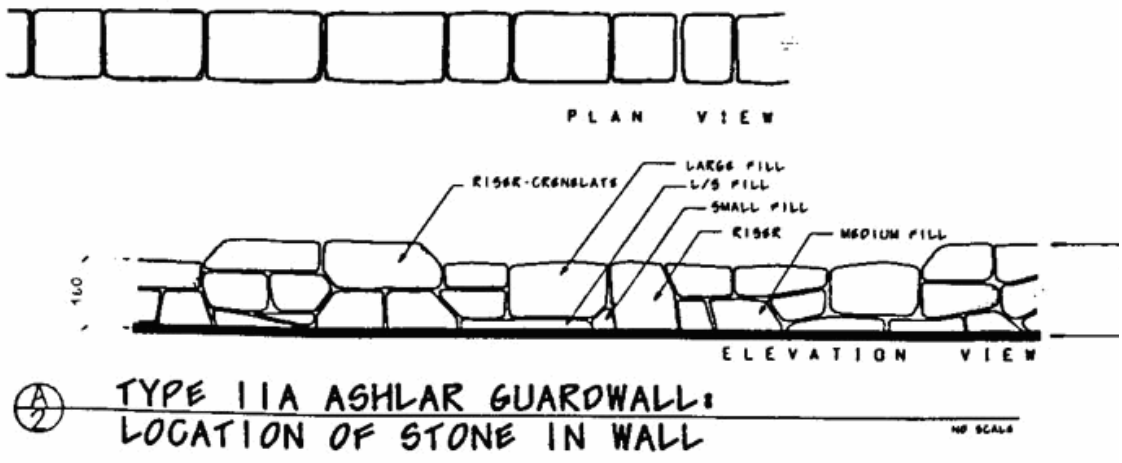
Haystack Creek culvert (built 1926) is of typical of larger culverts along the Sun Road: reinforced concrete slab with a masonry facade. Note the removeable guardrail that replaced the original masonry guardwall. (HAER survey photograph 78-1)

Construction of 'triple arch' circumvented the need for a major retaining wall. (HAER survey photograph MT-79-1)

The "golden stairs" retaining walls (built 1933) are one of the largest structures along the Sun Road. They were constructed with native stone, as were all of the road's original walls, to blend them with park scenery. (HAER survey photograph MT-83-1)



Specifications for Type II random rubble guardwall. (GNP drawing)



Specifications for Type IIA ashlar guardwall. (GNP drawing)

Post-Construction: 1956-Present

Reconstruction and rehabilitation projects on the Sun Road from the 1950s until the 1980s were relatively limited in scope. This period opened with the "Mission 66" era (1956-66), a nationwide program designed to improve infrastructure and visitor facilities at NPS units. At Glacier, Mission 66 projects included the construction of the Logan Pass and St. Mary Visitor Centers; campground construction and improvement; new comfort stations at camping and picnic areas; and other work. The parking lot at Logan Pass was expanded in 1965 to address

overcrowding, and the landscape islands eliminated to provide additional parking spaces. The roadway itself, however, was relatively little impacted by Mission 66 projects. (Mission 66 and subsequent developments are outside the recognized period of historic significance for the Going-to-the-Sun Road, and the historic significance of these resources has not been fully established.)

Northwest Montana experienced a major flood in June of 1964. Lake McDonald peaked at eight feet above normal high level, and the St. Mary area was flooded. Park Headquarters at West Glacier was isolated after the 1938 bridge over the Middle Fork collapsed and the 1920 bridge upstream lost its decking. The Roes Creek bridge was destroyed. The total damage to the Sun Road reached $2.25 million. The destruction was particularly heavy along upper McDonald Creek, requiring some sections of the road in that area to be wholly reconstructed in 1965. (These reconstructions included a 28-foot roadway top width, wider than the 22 to 26 foot roadway that had previously existed.) The 1964 flooding also demolished the 1937 Middle Fork bridge at West Glacier, forcing the Park Service to quickly repair the old Belton Bridge and temporarily reopen the original entrance roadway through Park Headquarters. (This historic route reverted to pedestrian use when a replacement West Glacier bridge was completed in 1966.)

Other major floods in 1975 and 1995 caused additional, but less significant, damage to the Sun Road, forcing other rounds of temporary closures and hasty repairs. One major project on the west side of the road took place over the winter of 1966-67. The West Side Tunnel was significantly enlarged, straightened, and lined with concrete. The work was done to eliminate "the worst bottleneck and safety hazard" on the road, but it significantly damaged the historic character of the tunnel.

In 1982, Congress recognized the need to rehabilitate and upgrade the deteriorating road system in national parks and on national parkways and passed the Surface Transportation Assistance Act. This act established a Federal Lands Highways Program that made Highway Trust Fund money available for constructing and rehabilitating park roads. The act allowed Glacier to obtain federal funding for road rehabilitation projects rather than having to fund such work from the park's general operating budget. The park roads standards developed in 1967 were revised and expanded in 1984 in preparation for the massive park roads work funded under this act. The new standards retained the basic philosophy and principles of the 1967 version.

The Sun Road was and continues to be eligible for rehabilitation under this program. The FHWA and the NPS signed a new interagency agreement in 1983. Under this agreement, the role of the NPS was defined as developing park road design, construction, maintenance, and safety standards and providing architectural and landscape architecture services. The FHWA is responsible for planning, assistance, research, engineering studies, traffic engineering services, project development, and contract administration. In 1984, the FHWA prepared a Road Rehabilitation Planning Study that proposed corrective actions and a range of alternatives for Glacier's roads. It identified over $50 million in road repair and rehabilitation needs to maintain the park's road system, the majority on the Sun Road. By the end of the decade, the first substantive federal funding was received to begin addressing that backlog, and a series of

significant rehabilitation projects took place along the road in the years since. Some $28,000,000 in repair and rehabilitation work on the road has been undertaken since 1984.

Some twenty-one miles of the Sun Road were improved under FHWA contracts in the 1990s, for a total cost of approximately $25.8 million. (The 3.1 mile section from West Glacier to Apgar was rehabilitated prior to 1990) These projects saw the reaffirmation of a number of design standards for the road based on historic precedents and plans. The first contract – between Apgar and the head of Lake McDonald – took place from 1990 to 1992. Work completed on the segment included subgrade improvements and repaving the segment to provide a consistent 22-foot-wide travel lane. Culverts were replaced, with the original stone headwalls reassembled around the new pipes. Twenty of the 41 turnouts on the road segment were removed, mostly small unplanned pullouts which had appeared over time in the course of road maintenance and use. Remaining turnouts were formalized and improved with log curbing and timber guardrail based on historic “Type 7" designs. Other pullouts were formally designated as “slow traffic” turnouts.

The St. Mary contract (1991-93) was similar in design and scope to the work completed earlier along Lake McDonald. Subgrade deficiencies were corrected, a consistent 22-foot paved roadway width was confirmed, minor turnouts were removed and others improved, and slow traffic pullouts were established. Detailing at turnouts included both Type 7 timber guardrail, and three small sections of new rubblestone wall. The project also saw the rehabilitation of the historic St. Mary River bridge. Work at Rising Sun (1994-95) emphasized roadway and structure improvements in and near the Rising Sun concession area. The main parking lot was reconfigured and improved, Type 7 guardrail was installed, and log guardrails were placed on the upper Roes Creek bridge.

Attention shifted to the Alpine portion of the road in 1995-96, with the rehabilitation of the Logan Pass parking lot and of the Sun Road from the Pass to just below Oberlin Bend. This project, the most significant rehabilitation effort to date on the road’s Alpine section, included grading and paving work, drainage improvements, and stone guardwall and retaining wall repair and reconstruction. The guardwall work near Oberlin Bend included construction of the first “cavity-fill” wall on the road. This modern design utilizes a central concrete stem surrounded by stone facing, creating a more-stable wall that emulates the historic “Type II” wall design. This guardwall replaced a section of two-foot high non-crenellated post-1940 wall. Visitor parking was also addressed in this contract: the Logan pass parking area was reconfigured and reorganized for greater capacity, and a sidewalk was constructed around the perimeter. The Oberlin Bend pullout/parking area was formalized, and opportunities for informal roadside parking were eliminated. A new retaining wall, faced with stone, was added behind the Oberlin Bend pullout, and Type 7 log guardrail was added to the area.

The summers of 1998 and 1999 saw the rehabilitation of the Sun Road between the head of Lake McDonald and Avalanche. Design precepts similar to those used on the road’s other 1990s-era projects were also utilized along this segment. Pullouts and viewing areas along upper McDonald Creek were reconfigured and formalized; new stone guardwall and Type 7 log guardrail were utilized at these locations. Additional Type 7 guardrail was installed near

Avalanche to discourage informal roadside parking. Together, this series of projects has seen the rehabilitation of over 24 miles of roadway; much remains to be done, however, particularly on the road's upper reaches. During the 1980s, the people involved in planning for the Sun Road included representatives of Glacier (maintenance, natural resources, administration, landscape architects), the FHWA, the NPS Intermountal region office, and the Denver Service Center. Today, after a nationwide reorganization of the NPS, the regional office and the Denver Service Center no longer review designs related to the road, but the park divisions still do. The park's landscape architect has the ability to inspect projects and recommend acceptance to the park superintendent. If there are any problems, park staff has to go through the FHWA rather than deal with the contractor directly, because the FHWA administers the contracts.

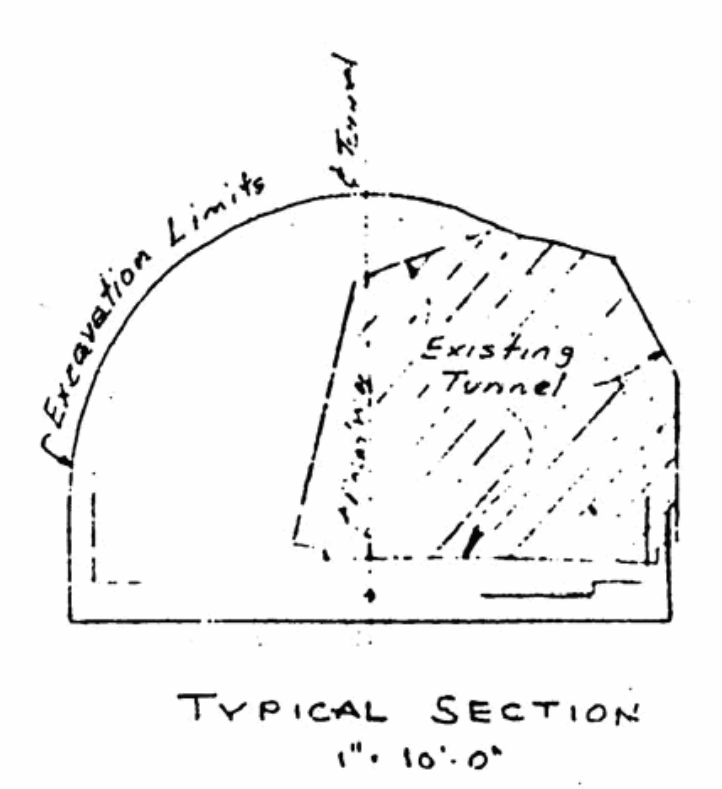
The significance of park roads as designed historic landscapes began to be recognized in the 1980s. At the same time, safety considerations grew in importance in park road design and rehabilitation. This led to conflicts in various national parks, including Glacier, relating to concerns about safety versus the preservation of cultural and scenic values. The FHWA and the NPS have disagreed in recent years on particular safety issues. The FHWA was concerned, for example, that the existing guardwalls were not high enough to meet federal crash standards. A team of NPS and FHWA representatives agreed to a compromise: a concrete cavity-fill wall built to the historic heights of 18 and 24 inches – lower than current national standards for such walls, but more in keeping with historic Sun Road designs. Minimum requirements for length and height in order to determine which sections of wall must be replaced with cavity-fill walls and which may be replaced with ashlar or rubble masonry walls have not, however, been established. Another recent issue that has not yet been decided is whether or not cavity-fill guardwall may be placed on top of historic masonry retaining walls. Cavity-fill guardwalls continue to be built along the road on an as needed basis as required by specific projects.

Many of the rails on bridges built in the 1920s and 1930s along the Sun Road also do not meet present crash-testing standards. An important agreement was reached recently as a result of a debate between the NPS and the FHWA over the rail on the upper Roes Creek Bridge (within the Rising Sun concession complex). The FHWA preferred steel-backed rail to the proposed log rail. In the end, however, the FHWA agreed that standards were not based on the speeds, angles of impact, and sizes of vehicle that are typical on the Sun Road, and log rail was allowed. A 1998 FHWA evaluation of the retaining walls along the Sun Road listed serious structural problems at 76 of the 126 walls. The NPS secured funding for some retaining wall repair; this masonry work has been contracted out and has been on-going since that time. Although some two miles of masonry guardwalls also need to be reconstructed, this work has been deferred because it is seen as aesthetic rather than structural in nature.

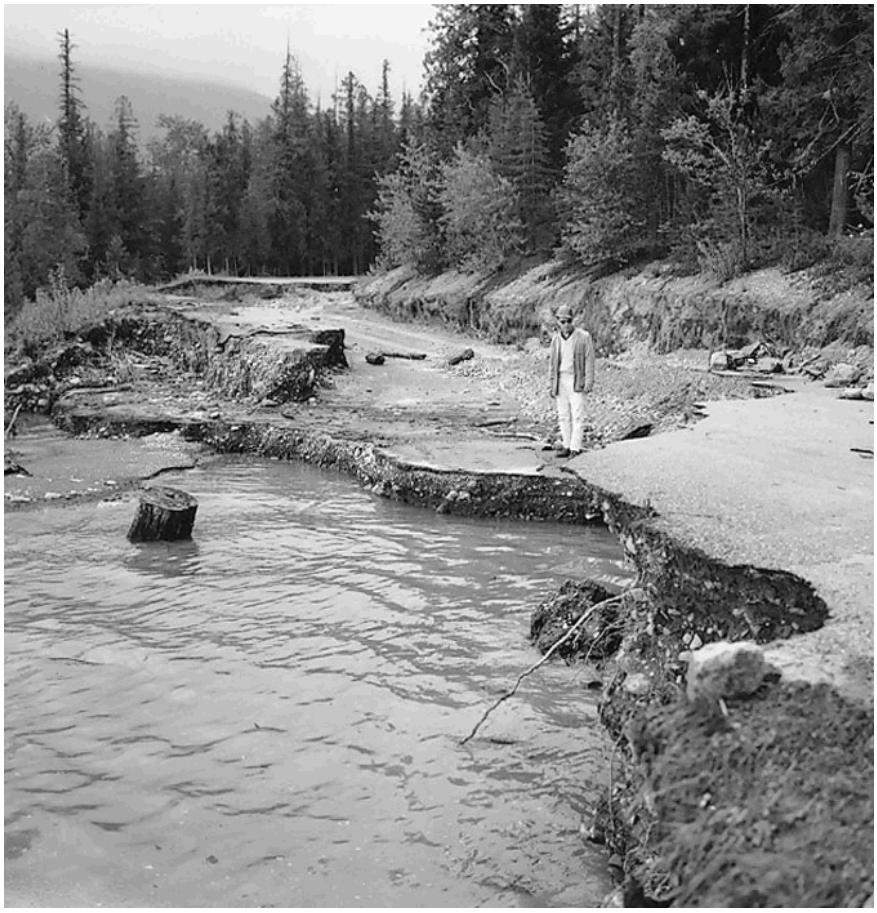
As of 2002, approximately 30 miles of the Sun Road still needs to be reconstructed, including nearly all of the 11-mile section between the West Side Tunnel and Siyeh Bend. In 1999, Congress appropriated $1 million to conduct additional analysis of the proposed reconstruction of the Sun Road. The Secretary of the Interior appointed a federal Citizens Advisory Committee to advise the Park Service in the development of alternatives for reconstruction of

the road. The engineering firm MK Centennial (now known as the Washington Infrastructure Group) was hired to conduct further studies of the engineering, socioeconomic, cultural resource, transportation, and visitor use issues related to the reconstruction of the Sun Road. All findings of this effort will be contained in an Environmental Impact Statement to be completed in 2003. Until this work is completed, the NPS is continuing to contract out critical road reconstruction as necessary to address the most serious structural problems.

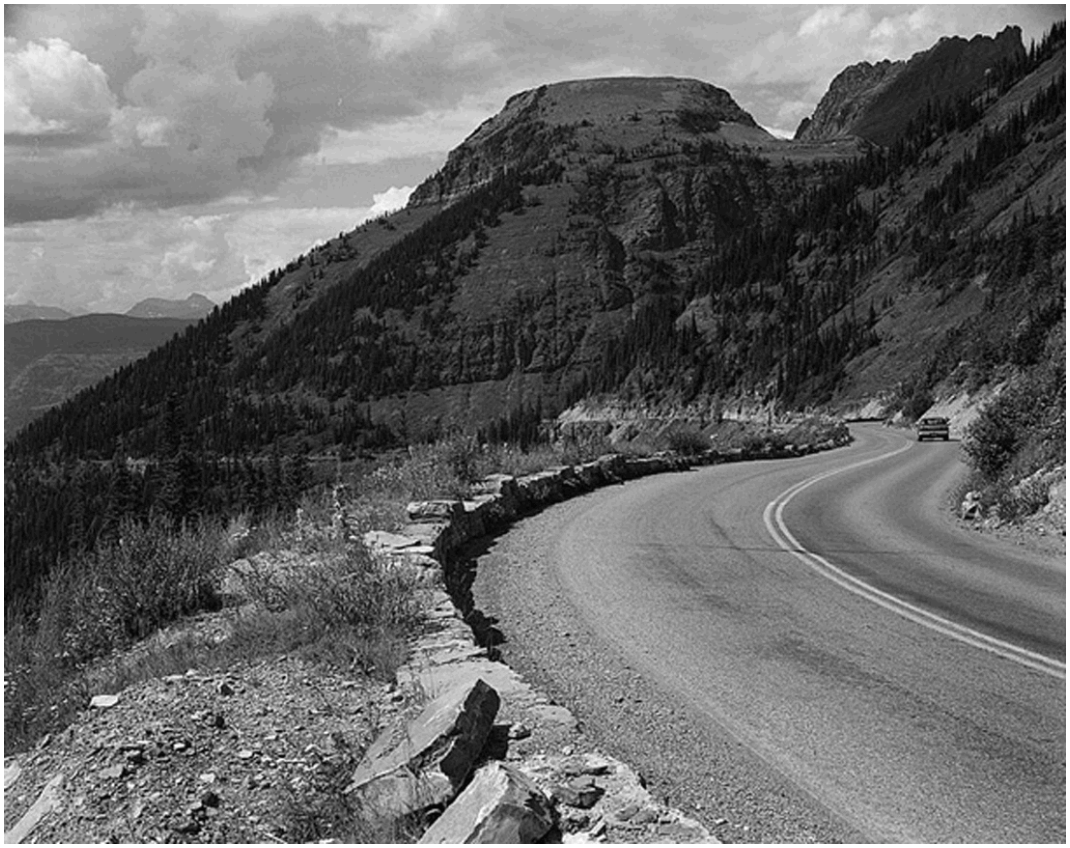
The view of East Side Tunnel and Clements Mountain has not changed significantly since the road was constructed. Note the temporary Type 7 concrete guardrail near the tunnel entrance. (2002 photograph, NPS)



Widening of West Side Tunnel in 1966-67 resulted in much larger tunnel than was present during the historic period. (TIC drawing 351)

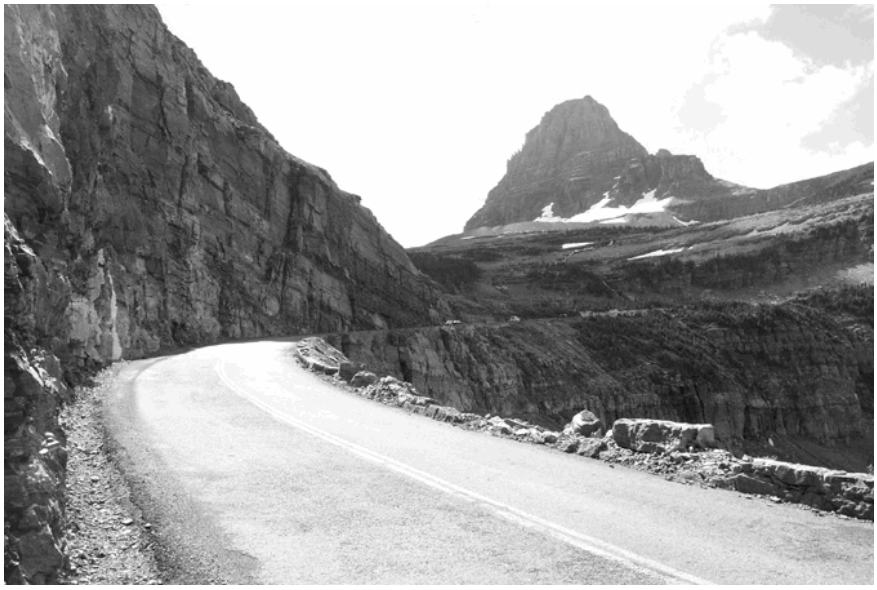


Floods in 1964 caused $2.25 million in damage to the Sun Road. The destruction was especially heavy along upper McDonald Creek, causing some sections in that area to be wholly reconstructed in 1965. (GNPA #1892)

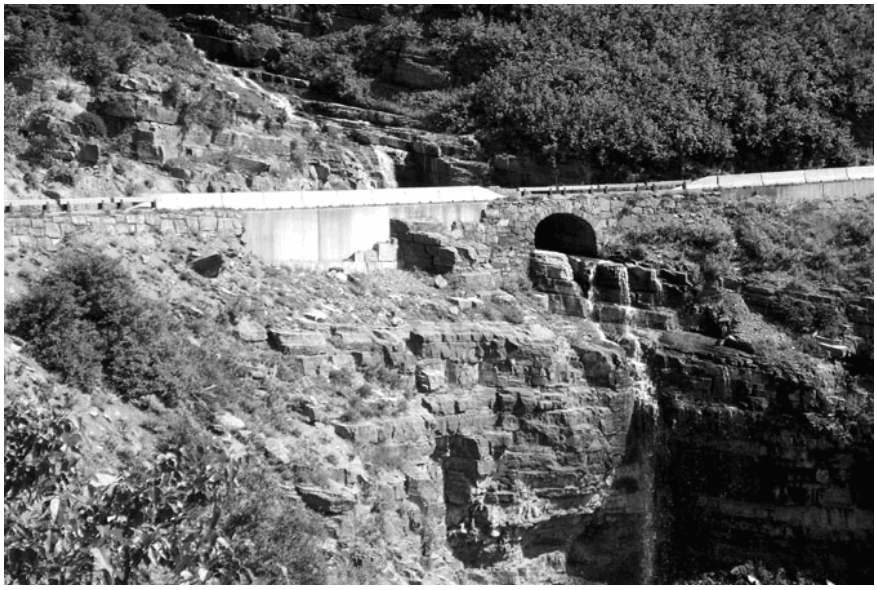


Parapet guardwalls suffer from effects of weather, including avalanches, dislodging stones. (HAER survey photograph MT-67-24)

Sections of guardwall, such as this on the St. Mary side of Logan Pass, lean outward, and/or are encroached upon by successive layers of pavement. (2002 photograph, NPS)

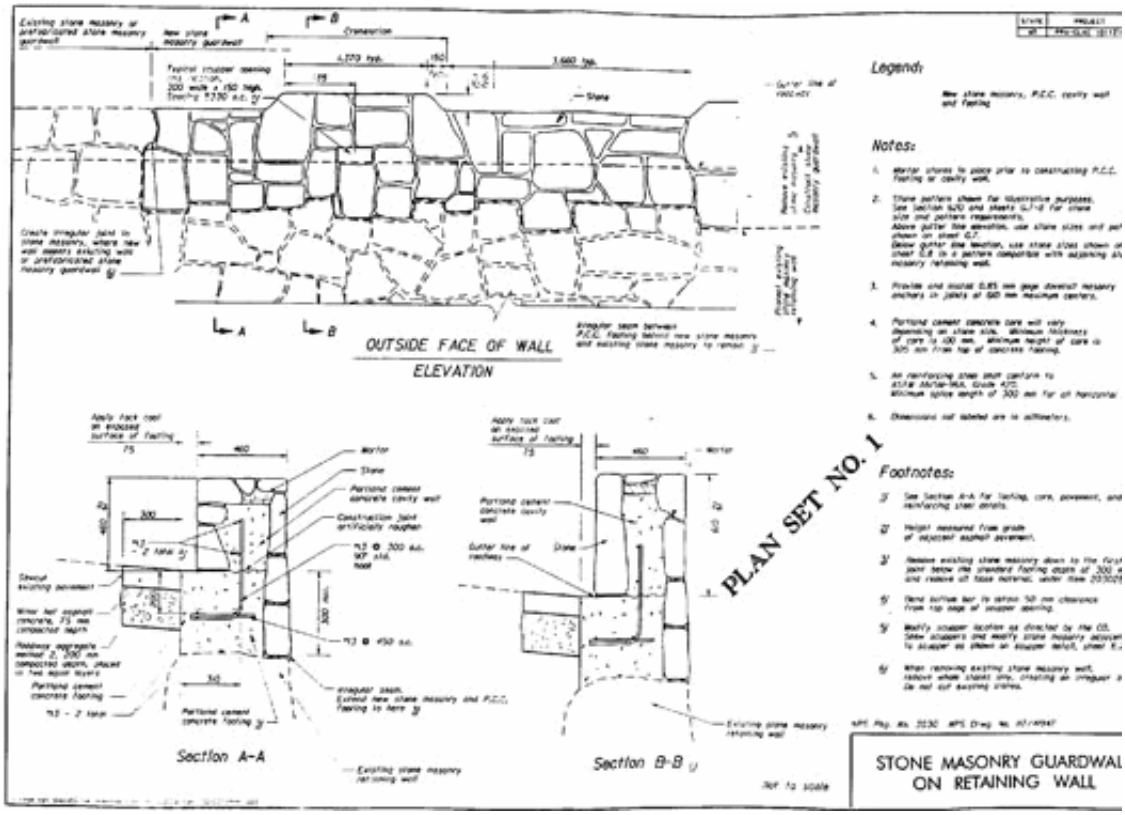


Many guardwalls, such as this one west of Logan Pass, have become degraded due to both avalanches and snow removal activity. (2002 photograph, NPS)



The Haystack Creek culvert is now flanked on both sides by exposed concrete with incomplete masonry facing, due to further avalanche damage in the mid-1990s. (2002 photograph, NPS)

The dry-laid retaining wall and Type II guardwall at the Loop were reconstructed in 2001 to mimic the historical design. (2002 photograph, NPS)



Concrete cavity fill design for the Type II guardwalls both complements the historical walls and meets FHWA safety standards. (GNP drawing)

Reconstructed Type II guardwall with a concrete core faced with local stone, and drainage weepholes where appropriate. (2002 photograph, NPS)

Reconstructed concrete retaining wall faced with local stone and topped by guardwall. (2002 photograph, NPS)

In 1965 the Logan Pass parking lot was expanded, eliminating its character of irregular parking areas located within islands of vegetation. A 1996 reorganization increased the lot's capacity through greater efficiency. (2002 photograph, NPS)

Log curbing was added to pullouts along McDonald Creek in the early 1990s. (2002 photograph, NPS)

Type 7 timber guardrail based on historical designs was added to pullouts along McDonald Creek, Lake McDonald, and St. Mary Lake in the early 1990s. (2002 photograph, NPS)

Analysis & Evaluation of Integrity

Analysis and Evaluation of Integrity Narrative Summary:

Going-to-the-Sun Road was developed to provide a means for accessing Glacier National Park's scenery via automobile, and to provide an east-west link through the park. The roadbed itself was designed to follow the topography, rather than traverse it, thus preventing road engineering from being a dominant feature of the park. Road width was held to a minimum for budgetary – and later for aesthetic – reasons, giving the feeling of a rural road winding through the forest and along mountain edges. The road is considered to have retained integrity, as its original alignment and width, most of the original structures, and views from the road survive much as they were shortly after construction.

Spatial organization of the road was largely determined by the road's orientation on an east-west axis through the park, and the topography associated with that axis. As a result, the road guides visitors through a sequence of changing environments that include lakeshore, streamside, open meadow, cliffside, and mountain pass resulting in visual experiences ranging from confined spaces to broad lake, mountain and valley vistas. Initially for budgetary reasons, and then deliberately to retain Glacier's wilderness character, Going-to-the-Sun Road provides the only automotive link between the east and west sides of the park. As such, many of the park's visitor services and recreation opportunities are located along the road corridor, and the majority of park traffic occurs in this corridor.

Large and small structures along the road – such as bridges, culverts, guardwalls, and retaining walls – were designed in the "NPS Rustic" style to complement rather than compete with the scenery. Many of these structures survive intact today, although many are in need of rehabilitation. Smaller scale features, such as signs, and log guardrails historically reinforced the rustic feeling along the road. However, replacements have oftentimes deviated from the original style and have affected the overall aesthetic of the road.

Views of surrounding terrain were considered during initial planning; as a result, the road alignment was set to maximize these views. Lower portions of the road continually interact with nearby scenic features without overwhelming them, and the alpine alignment was chosen in large part for its scenic view opportunities. Outside the alpine segment of the road, many views are dependent on breaks in the vegetation. However vegetation is dynamic, and some areas of the road that were historically associated with open views are now filled in with vegetation. Conversely, fires, floods, avalanches and natural cycles of plant growth have opened vistas at many other locations.

The National Historic Landmark nomination lists fourteen structures as contributing to Going-to-the-Sun Road’s significance. These features are listed at the end of each appropriate Analysis and Evaluation section.

INTEGRITY EVALUATION: Going-to-the-Sun Road retains integrity.

LOCATION: Most of the 48.7 miles of road remains on its original alignment. The alignment remains true to the locations suggested by National Park Service landscape architect Thomas Vint. Relatively

minor changes to the road alignment have been made since initial construction, and many of these changes occurred during the period of significance. Also some curves have been modified. But none of these changes, individually or collectively, have affected the integrity of location

SETTING: Fires, floods, avalanches and natural cycles of plant growth and park development have altered views from Going-to-the-Sun Road, but none of these changes have significantly altered the magnificent physical setting of this historic road. Going-to-the-Sun Road retains integrity of setting.

DESIGN: Going-to-the Sun Road possesses exceptional integrity of design. Besides maintaining most of its original alignment, the 22-foot roadway width has been maintained, except on the 10-mile traverse of the Garden Wall, which has always been narrower in some places. Fourteen major structures dating from 1926-37 exist along the road. Many minor features – including masonry culvert headwalls, retaining walls and 40,000 feet of crenelated stone guardwalls – exist to define the road's historic architectural and engineering design character. Some design elements that made Going-to-the-Sun Road distinctive have been altered over the years, including some new masonry work, signage and log railings, but these have had minor impacts on the road's design.

MATERIALS: Going-to-the Sun Road's integrity of design results from the retention of historic materials. Over the years some new materials have been introduced, including stone-veneered concrete retaining walls and new methods of constructing crash-resistant guardrails with concrete cores and rock facing. While some of the new materials and construction methods have compromised the integrity of Going-to-the-Sun Road, it still retains excellent integrity of materials.

WORKMANSHIP: It is in the area of workmanship that Going-to-the-Sun Road expresses the National Park Service's rustic design ethic. The skill with which the road was built across the landscape is evidenced in the altered natural environment and the thousands of feet of stone structures. Most of the original stonework of the bridges, arches, retaining walls and guardrails was completed by immigrant stone masons. National Park Service landscape architects carefully inspected their work to avoid regularity in workmanship details that would conflict with rustic design philosophies. Repairs and new work have not always exhibited the same level of skill and art. Recent work, however, reflects the workmanship of the historic period. The landscape retains integrity of workmanship.

FEELING: The grand plans and visions of the men who conceived of Going-to-the-Sun Road, and guided its construction, were fulfilled when the road was first opened in 1933. Today, the road still thrills visitors with its original alignment, narrow width and stone structures as they view the unparalleled vistas. The road retains integrity of feeling.

ASSOCIATION: The opening of Going-to-the-Sun Road signaled the implementation of an important landscape design philosophy within the National Park Service. It was a philosophy that would be copied across the nation, especially through the years of the Great Depression. The road design unified the fields of engineering and landscape architecture, and it endures today as perhaps America's finest example of this important design ethic. The retention of its natural and manmade elements clearly conveys integrity of association.

Landscape Characteristic:

Spatial Organization

The spatial organization of the road was largely determined by the final decisions regarding the road's location. The shores of Lake McDonald (on the west side) and St. Mary Lake (on the east side) offered relatively level routes leading into the park, heading toward the continental divide from either side. The lakeshore portions of the road are relatively flat, straight, and at lower elevations (3,000-4,500 feet) than other parts of Going-to-the-Sun Road. These sections are characterized by broad vistas, often with the lakes in the foreground.

On the ascent to and descent from the continental divide at Logan Pass, the spatial character of the road changes greatly. The higher elevations result in the remarkable panoramas of the glacial high country that make the road famous. Although hairpin and other tight turns were mostly avoided, benching of the road into solid rock resulted in slight narrowing of the roadway in places – and certainly an awareness of the steep drops just over the guardwalls. The narrowness of the roadway and height of the guardwalls combine to create a characteristic and unique impression.

Topography

The park's topography was the single greatest factor in determining the location and character of Going-to-the-Sun Road. The lakeshores of Lake McDonald and St. Mary Lake offered relatively level "water grade" access to the interior of the park, near its center, along a roughly east-west line. These convenient approaches to the Continental Divide from either side of the park helped determine the location of these principal park entrances. The passes through the mountains and over the divide each offered their own benefits and drawbacks. Every aspect of the road's location was predicated on a response to the site's extraordinary topography.

The decision to follow McDonald Creek (north of Lake McDonald) also took advantage of the easiest route toward the divide. Continuing to follow the creek valley as it turned away (to the northwest) from the mountain passes was part of the decision to approach Logan Pass along the route suggested by Vint and surveyed by Kittredge. By continuing to follow the creek, grades remained relatively gentle. The one great switchback, called the Loop, then allowed the alignment to begin traversing the sheer sides of Haystack Butte and the Garden Wall in a relatively straight shot for about 10 miles, at an average grade of six percent, to Logan Pass (6,646 feet). Along the way, the cliffside alignment offered spectacular views to the south and west.

The most significant response to topography involved the decision to bench the road into the Garden Wall formation, rather than to build a series of switchbacks directly up the Logan Creek Valley (approaching Logan Pass from the west). This allowed the valley to remain untouched below, where it continued to serve as a verdant foreground for the spectacular views from Logan Pass.

The gentler grades on the east side of Logan Pass allowed for a descent with one, much

shorter switchback. As the road approached St. Mary Lake, Thomas Vint requested that Frank Kittredge's original alignment be adjusted to keep the road higher, and away from the lakeshore at first. This adjustment, which Kittredge agreed to, protected more of the shore, and provided the dramatic views of the lake from above that now characterize this portion of the road. The road exits the park, again on easy grades, following the northern shoreline of St. Mary Lake.

Character-defining Features:

Feature: Shores of Lake McDonald and St. Mary Lake offer relatively level access to interior of the park near its center along a roughly east-west line

Feature Identification Number: 99767

Type of Feature Contribution: Contributing

Feature: McDonald Creek provides gentle grades on route toward Continental Divide

Feature Identification Number: 99766

Type of Feature Contribution: Contributing

Feature: Garden Wall formation presented opportunity to bench road into cliffside, leaving the Logan Creek Valley an untouched foreground for views from Logan Pass

Feature Identification Number: 99764

Type of Feature Contribution: Contributing

Feature: Grades east of Logan Pass allow gentle descent from Logan Pass with elevated approach to St. Mary Lake, providing dramatic view of the lake

Feature Identification Number: 99765

Type of Feature Contribution: Contributing

Circulation

Going-to-the-Sun Road provides the only automotive link between the east and west sides of Glacier National Park. Long considered a vital missing link in Stephen Mather's "Park-to-Park Highway" system, the road provided a scenic route that allowed interpark traffic to proceed between Yellowstone and the Pacific Northwest via Glacier. The location over Logan Pass (6,646 feet), and the sealing of the road in a national park, has always precluded significant commercial use of the road, which remains closed many months of the year and could never be negotiated by modern trucks in any case. U.S. Highway 2 over Marias Pass provides a more convenient route for commercial traffic. But despite its noncommercial nature, the road's value to local economies is huge, since hundreds of thousands of tourists are drawn to the area to drive the scenic route.

Because Going-to-the-Sun Road is the only extensive automotive route in the park, it defines Glacier National Park's basic circulation pattern. The road accesses many of the principal

points of interests, and many of the most stunning views in the park. The Lake McDonald Lodge (1914) as well as the Loop, Logan Pass, and Going-to-the-Sun Point (all points along the road) are among the most popular destinations in the park. Many trailheads are located at parking areas along the road, including the Sprague Creek Trail and the Highline Trail.

The importance of the road as the principal circulation system in the park has increased as use of trails by parties on horseback has declined significantly and very few park visitors now arrive by railroad. This circulation pattern has preserved the vast majority of the park from access by automobile; but the road also assured that automotive tourists would have access to some of the most impressive scenery in the park. This policy of limiting the amount of road built in a park but – assuring that what was built would provide an unsurpassed experience – made Going-to-the-Sun Road a successful prototype for national park road development.

Furthermore, three campgrounds located west of Logan Pass were developed along the road during its historic period. These provided – and still provide – automobile tourists the opportunity to camp without leaving behind the visitor services provided along the Sun Road corridor. Apgar, at the foot of Lake McDonald, began as a CCC camp that was formalized as a tourist campground in 1939. Sprague Creek, further up the shore of Lake McDonald, and Avalanche, adjacent to Avalanche Creek, were used early on as camps for railroad tourists and road building activities. They appear to have been formalized for automobile camping in the 1920s, as the 1926 park superintendant's report describes them as the most important campsites in Glacier. For the most part, Avalanche and Sprague Creek retain integrity of their early period and contribute to the historic character of the Sun Road corridor for visitors choosing to camp.

There are no major intersections within the historic district. Just outside the district, the road connects to Route 2 (the Marias Pass road) to the west, and Route 89 (the old Blackfeet Highway) to the east.

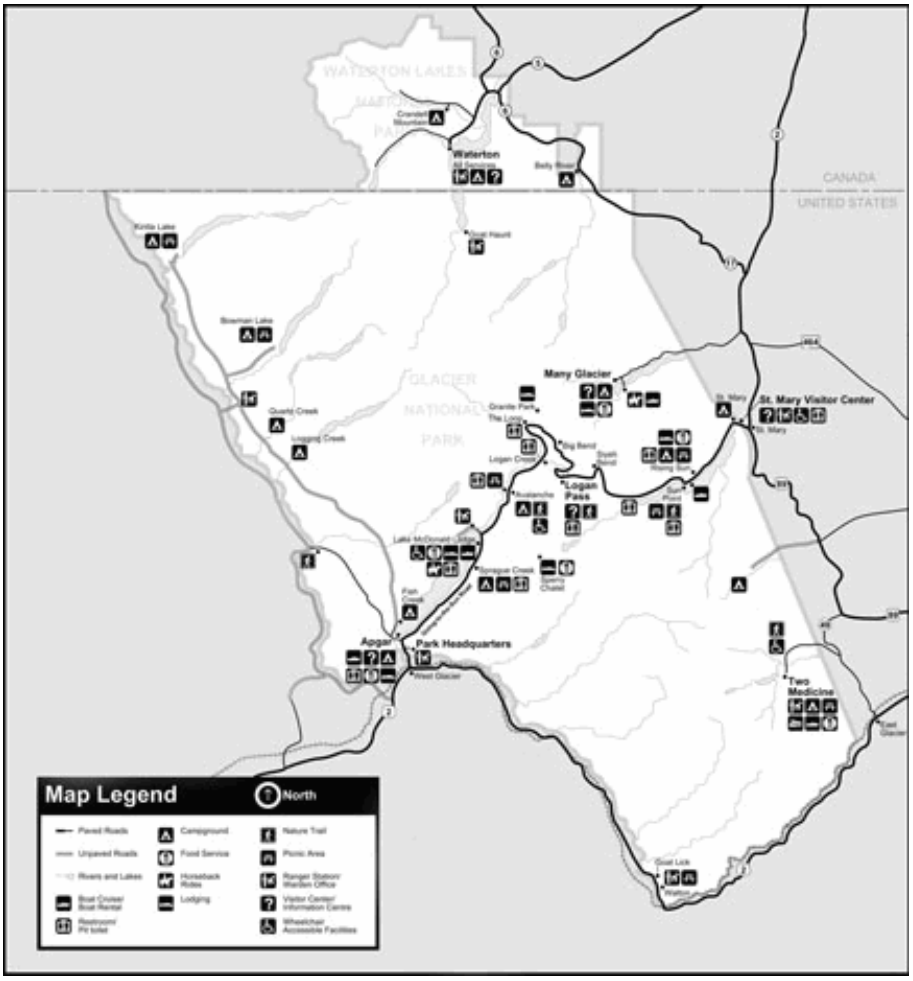
Character-defining Features:

Feature: Principal circulation system in park, providing access to services, campgrounds, scenery and points of interest

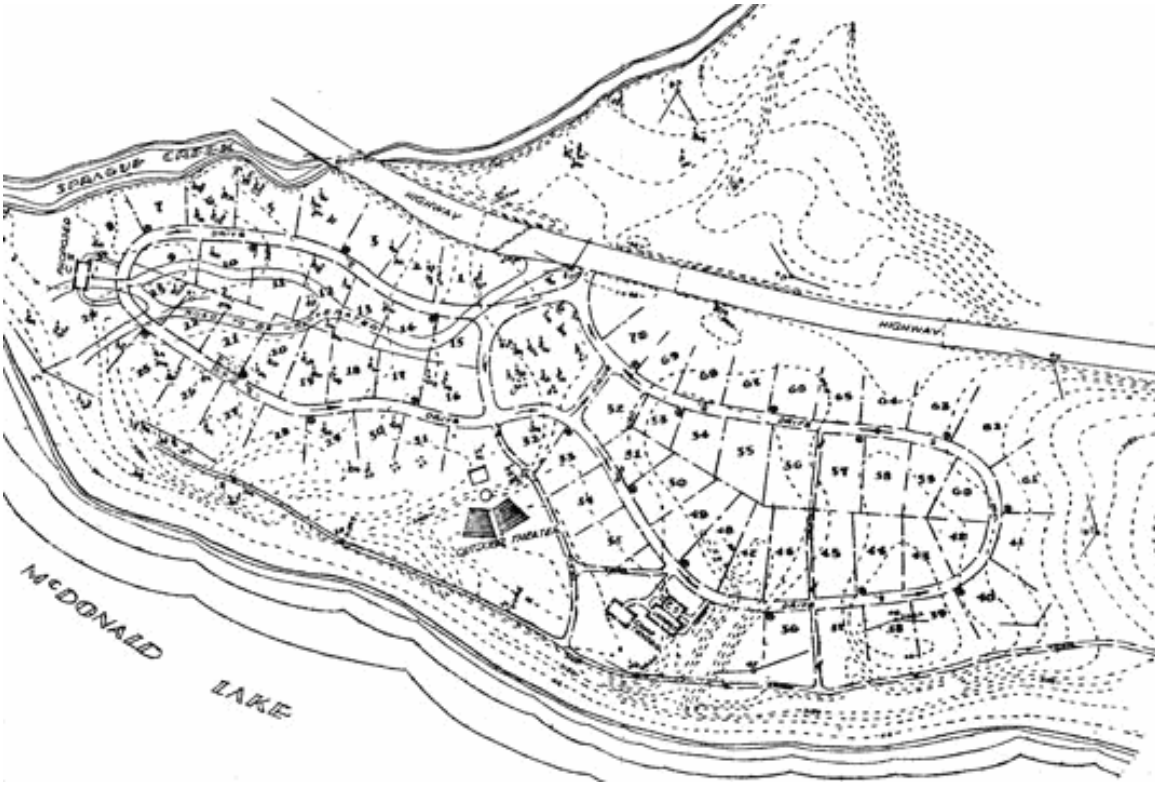
Feature Identification Number: 99754

Type of Feature Contribution: Contributing

Landscape Characteristic Graphics:



Most of Glacier's visitor services and recreation access points are located along Going-to-the-Sun Road corridor. The Road provides the Park's main east-west transportation route. (Map adapted from GNPA visitor information materials)



Campgrounds adjacent to the Sun Road were developed as a visitor service for automobile tourists, integral to the road's circulation pattern. Sprague Creek Campground has not changed much from this 1934 plan. (From TIC drawing 3066)

Buildings And Structures

Going-to-the-Sun Road itself, along with its associated minor structures of all types, is counted here as a single structure. Counted with the road are all the culverts, guardwalls, and other structures not listed below individually.

Among the most significant aspects of the Going-to-the-Sun Road are the approximately 40,000 feet of historic, crenellated stone guardwalls that line much of the route. Masonry construction, including sometimes massive retaining walls, was a major aspect of road construction. Native stone salvaged from excavation (mainly buff limestone, red argillite and green argillite) was used throughout, and masonry beds were rigorously inspected to avoid any sense of regularity in the courses.

Two distinct types of construction are evident. Random rubble construction, referred to as Type II, used stones of a variety of sizes and shapes, generally not rectangular, with prominent mortared areas and longitudinal jointing. Ashlar construction, referred to as Type IIA, was assembled from stones shaped into rectangular blocks having a top boulder course with no longitudinal joints. Type II is the older of the two and was typical of the Williams & Douglas contract west of Logan Pass. Overall, Type IIA is more prevalent. Both are approximately 18 inches high, with six-inch high parapets about five feet long spaced every 9 to 12 feet. The

walls are typically 18 inches thick. The experience of constructing the guardwalls at Glacier was formative for the standardization of construction details for the national parks system.

The bridges and tunnels of the road are exceptional in their own right and retain remarkable integrity. The West Side Tunnel (1928) was cut through 192 feet of rock and has two observation galleries blased through the cliff face providing views of Heaven's Peak. The East Side Tunnel (1933) is 408 feet long. Like the tunnels, the major bridges were also technically advanced structures built under sometimes extremely difficult circumstances. Most of the bridges are reinforced concrete arches veneered in masonry of similar local stone, again carefully inspected in the field to avoid geometry or regularity in the joints of the masonry. Thomas Vint's landscape architectural division reviewed and approved all bridge designs, which were a special concern throughout the historic period.

The Loop, a large switchback at the beginning of the Garden Wall, is significant in its own right. The lower roadway curve is supported by perhaps the largest stone retaining wall on the road, which is dry-laid rather than mortared. Placement of this structure defined the road's ultimate alignment to Logan Pass, averting the need for a series of switchbacks.

In addition to the constributing features listed below, the road has many smaller culverts that are part of its drainage system. Stone-paved culvert inlets were installed to prevent erosion. Also, some 30,000 linear feet of corrugated pipe culverts were installed as construction progressed between 1925 and 1937. These pipes are typically 18" diameter with a masonry headwall about 5' wide and 2'-6" high.

Note that images for many of these features have been provided in the history section, and will not be repeated in this section.

Character-defining Features:

Feature: Avalanche Creek Bridge

Feature Identification Number: 95303

Type of Feature Contribution: Contributing

IDLCS Number: 51128

LCS Structure Name: Going-to-the-Sun Road Avalanche Creek Bridge

LCS Structure Number: BRDG018P

Feature: Baring Creek Bridge

Feature Identification Number: 95304

Type of Feature Contribution: Contributing

IDLCS Number: 51760

LCS Structure Name: Baring Creek Bridge- Going-to-the-Sun Road

LCS Structure Number: BRDG-X7

Feature: Divide Creek Bridge

Feature Identification Number: 95306

Type of Feature Contribution: Contributing

IDLCS Number: 51130

LCS Structure Name: Going-to-the-Sun Road Divide Creek Bridge

LCS Structure Number: BRDG028P

Feature: East Side Tunnel

Feature Identification Number: 95307

Type of Feature Contribution: Contributing

IDLCS Number: 51132

LCS Structure Name: Going-To-The-Sun Road East Side Tunnel

LCS Structure Number: 037P

Feature: Going-to-the-Sun Road

Feature Identification Number: 95308

Type of Feature Contribution: Contributing

IDLCS Number: 51133

LCS Structure Name: Going-to-the Sun Road Rt. 1

LCS Structure Number: R10A

Feature: Granite Creek Culvert

Feature Identification Number: 95309

Type of Feature Contribution: Contributing

IDLCS Number: 051757

LCS Structure Name: Granite Creek Culvert -- Going-to-the-Sun Road

LCS Structure Number: R-X4

Feature: Haystack Creek Culvert

Feature Identification Number: 95310

Type of Feature Contribution: Contributing

IDLCS Number: 051124

LCS Structure Name: Haystack Butte Amphitheater Culvert

LCS Structure Number: 041P

Feature: Horse Trail Underpass

Feature Identification Number: 95311

Type of Feature Contribution: Contributing

IDLCS Number: 51737

LCS Structure Name: Horse Trail Underpass -- Going-to-the-Sun Road

LCS Structure Number: R-X3

Feature: Logan Creek Bridge

Feature Identification Number: 95312

Type of Feature Contribution: Contributing

IDLCS Number: 051123

LCS Structure Name: Logan Creek Bridge -- Going-to-the-Sun Road

LCS Structure Number: BRDG026P

Feature: Siyeh Creek Culvert

Feature Identification Number: 95313

Type of Feature Contribution: Contributing

IDLCS Number: 051759

LCS Structure Name: Siyeh Creek Culvert -- Going-to-the-Sun Road

LCS Structure Number: R-X6

Feature: Snyder Creek Culvert

Feature Identification Number: 95314

Type of Feature Contribution: Contributing

IDLCS Number: 51736

LCS Structure Name: Snyder Creek Culvert -- Going-to-the-Sun Road

LCS Structure Number: R-X2

Feature: Sprague Creek Culvert

Feature Identification Number: 95315

Type of Feature Contribution: Contributing

IDLCS Number: 51735

LCS Structure Name: Sprague Creek Culvert -- Going-to-the-Sun Road

LCS Structure Number: R-X1

Feature: St. Mary River Bridge

Feature Identification Number: 97235

Type of Feature Contribution: Contributing

IDLCS Number: 051129

LCS Structure Name: St. Mary River Bridge -- Going-to-the-Sun Road

LCS Structure Number: BRDG027P

Feature: Sun Rift Gorge Bridge

Feature Identification Number: 99748

Type of Feature Contribution: Contributing

IDLCS Number: 051126

LCS Structure Name: Sun Rift Gorge Bridge -- Going-to-the-Sun Road

LCS Structure Number: BRDG008P

Feature: Triple Arches Half Bridge

Feature Identification Number: 99750

Type of Feature Contribution: Contributing

IDLCS Number: 051125

LCS Structure Name: Triple Arches Bridge -- Going-to-the-Sun Road

LCS Structure Number: BRDG038P

Feature: Type II Masonry Guard Rail

Feature Identification Number: 99751

Type of Feature Contribution: Contributing

IDLCS Number: 051121

LCS Structure Name: Type II Guard Wall -- Going-to-the-Sun Road

LCS Structure Number: HS-X17

Feature: Type IIA Masonry Guard Rail

Feature Identification Number: 99752

Type of Feature Contribution: Contributing

IDLCS Number: 051122

LCS Structure Name: Type IIA Guard Wall -- Going-to-the-Sun Road

LCS Structure Number: HS-X18

Feature: West Side Tunnel

Feature Identification Number: 99753

Type of Feature Contribution: Contributing

IDLCS Number: 051131

LCS Structure Name: West Side Tunnel -- Going-To-The-Sun Road

LCS Structure Number: 036P

Feature: The Loop (dry laid retaining wall supporting roadway)

Feature Identification Number: 99749

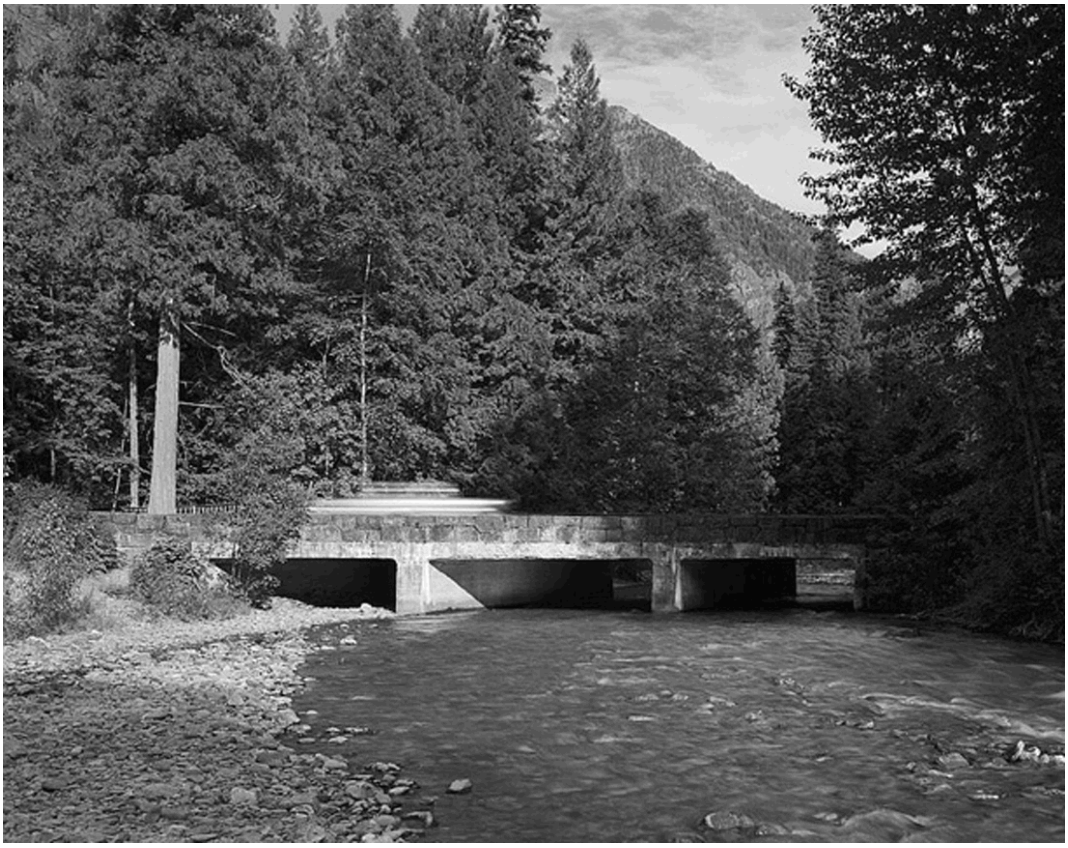
Type of Feature Contribution: Contributing

Feature: Crystal Point Arch

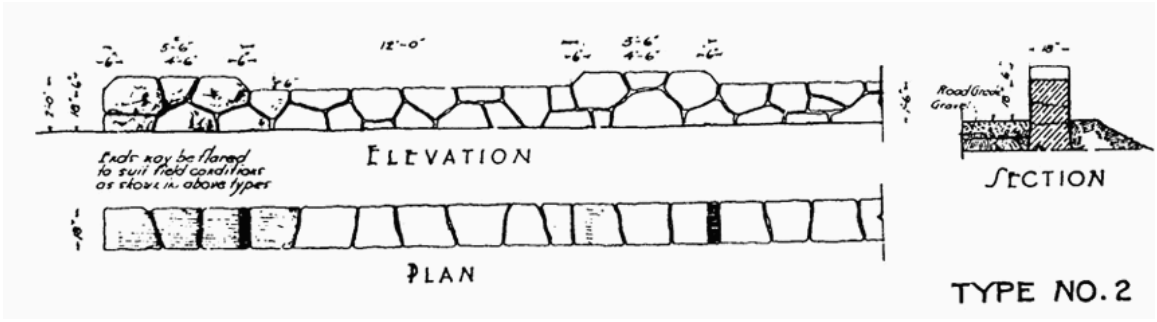
Feature Identification Number: 95305

Type of Feature Contribution: Contributing

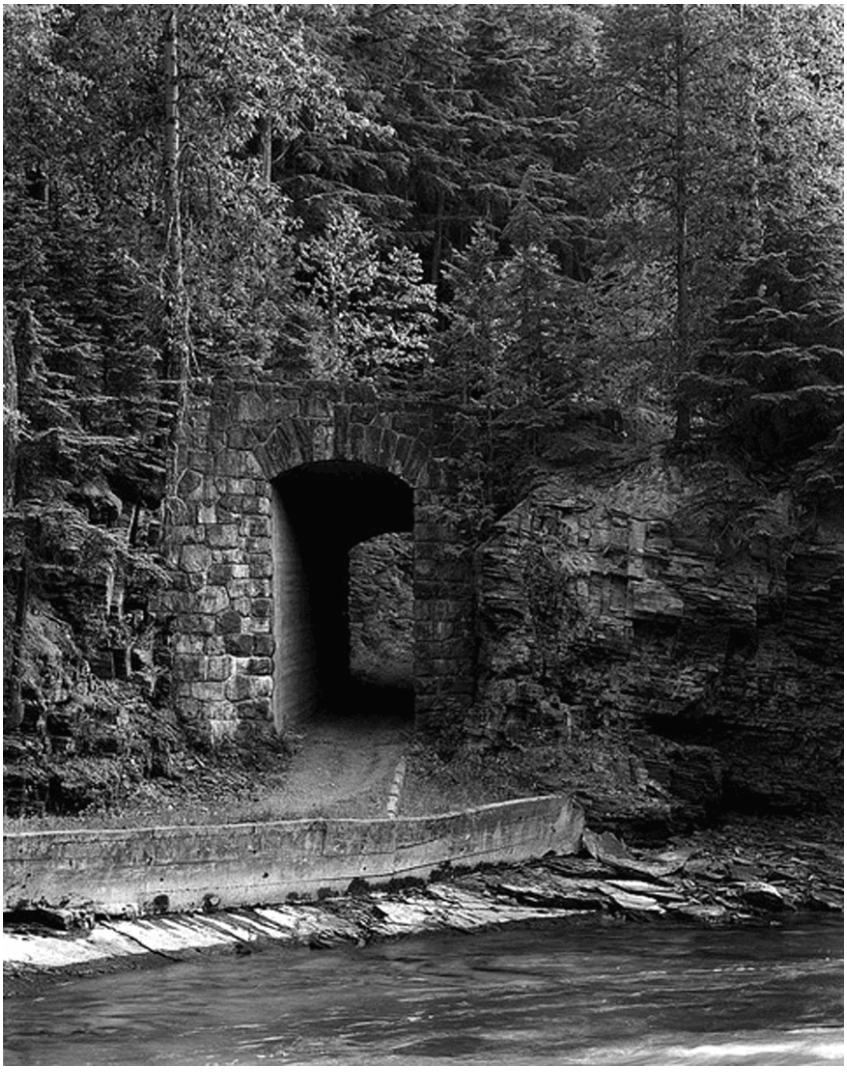
Landscape Characteristic Graphics:



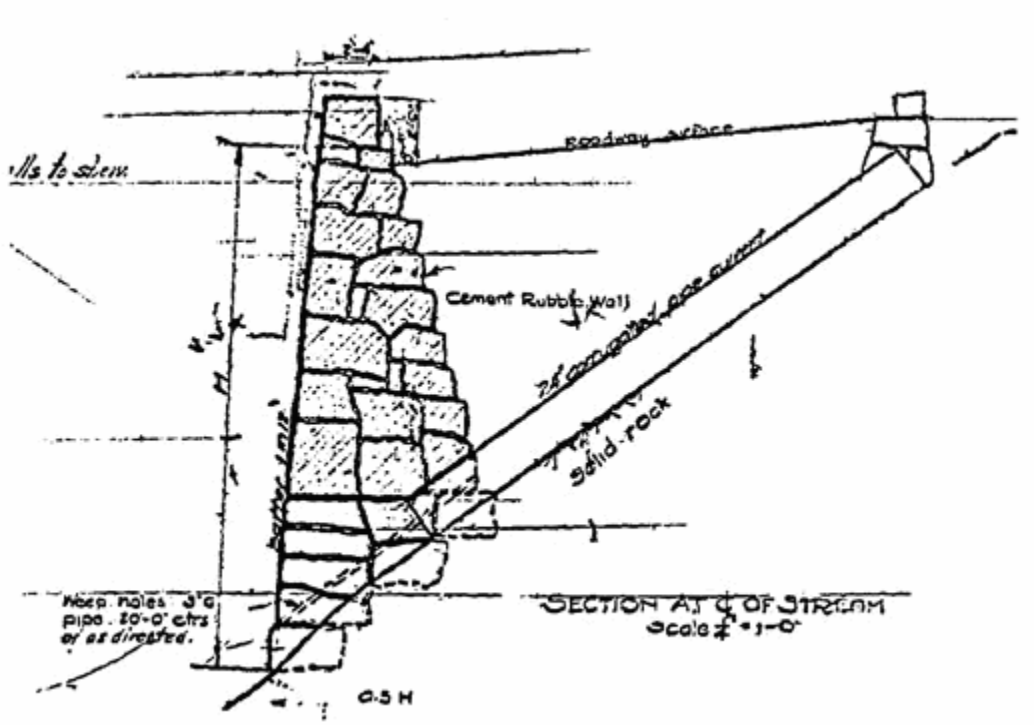
Avalanche Creek Bridge. (HAER survey photograph MT-73-1)



Standard design for masonry gtuardwall as used along the Sun Road, 1931. Although labeled as Type 2,"the drawing actually represents Type IIA ashlar wall. (TIC drawing 9390, no. 2)

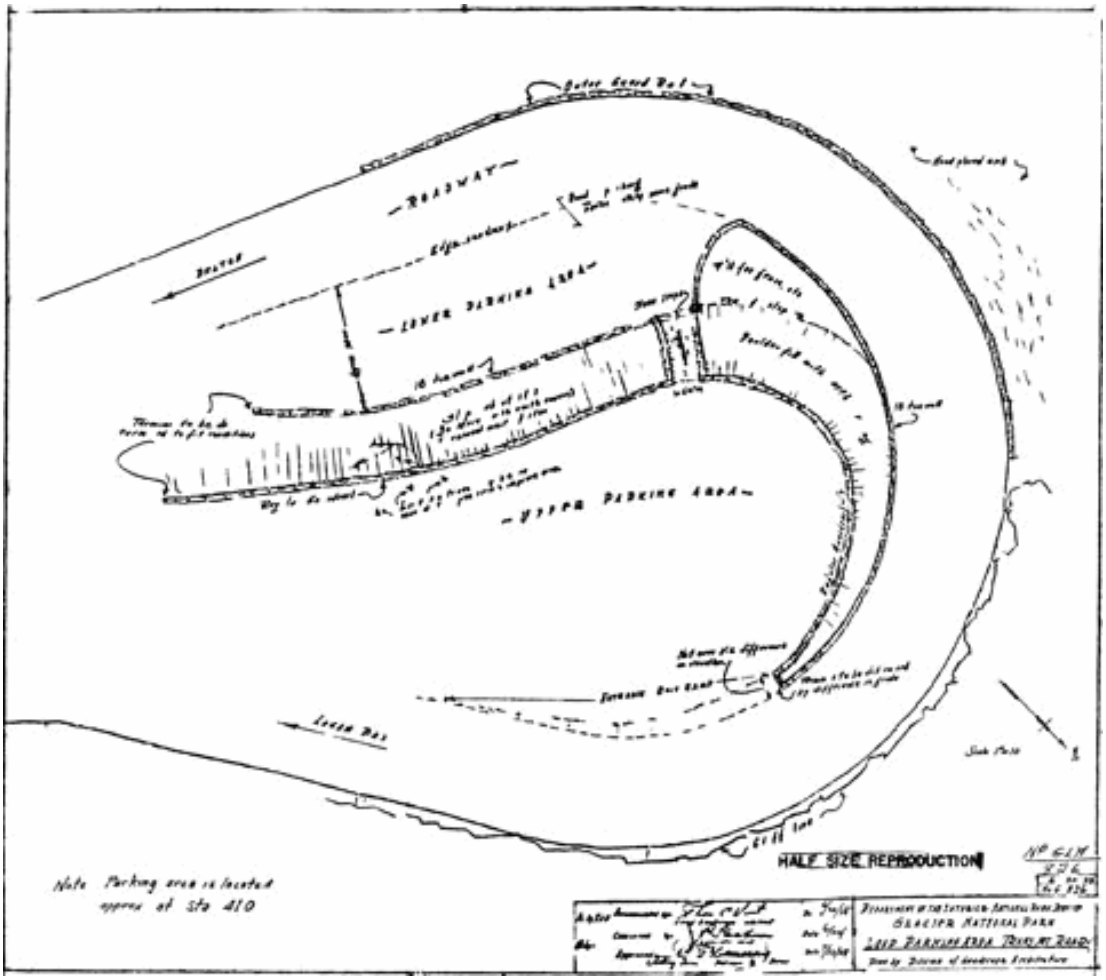


Horse trail bridge, view from west bank of McDonald Creek. (HAER survey photograph MT-72-1)



Typical masonry retaining wall design as used on the west approach to Logan Pass. (TIC drawing 36, no. 5)

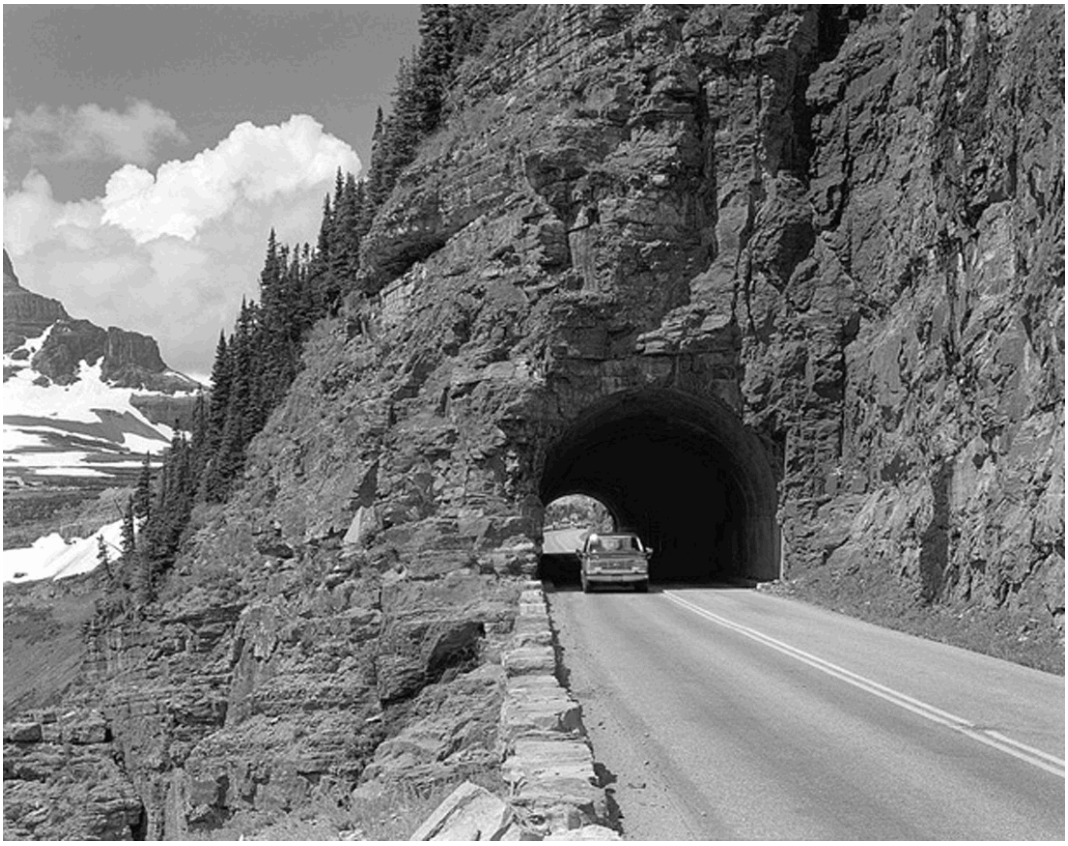
Snyder Creek Culvert. (HAER survey photograph MT-71-1)



The Loop's dry-laid stone retaining wall, faintly noted at the upper right, supports the Sun Road's only switchback. This original construction drawing notes details of the area, most of which retain their integrity today. (TIC drawing 826)

Bridge over St. Mary River. (HAER survey photograph MT-84-1)

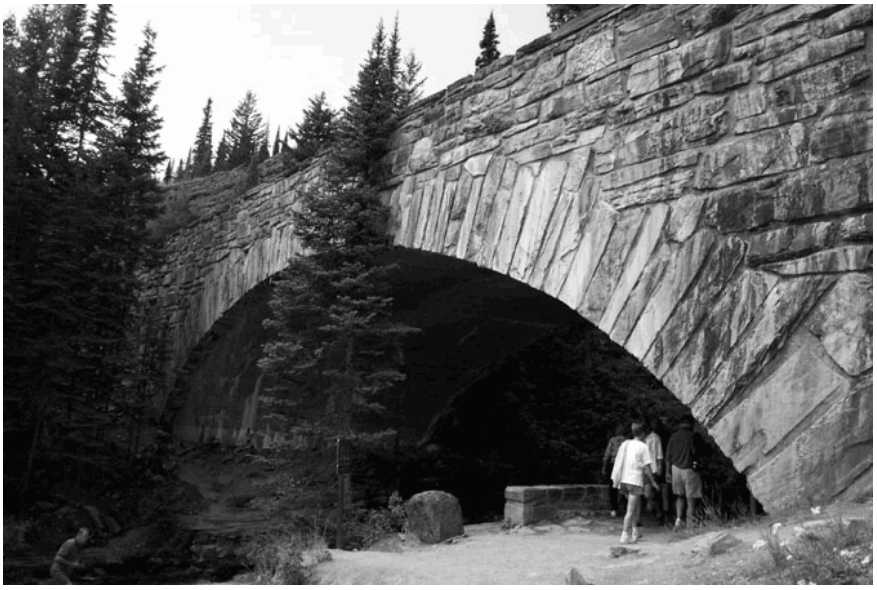
West Side Tunnel, south portal. (HAER survey photograph MT-76-1)



The East Side tunnel was lined in the mid-1930's to prevent water from dripping onto the roadway and creating icy conditions. (HAER survey photograph (MT-80-1)

Arched retaining wall at Crystal Point is an example of quality wall craftsmanship. (2001 Cultural Landscape Inventory photograph, NPS)

The Loop's dry-stack retaining wall is perhaps the largest engineered structure along the road. (2002 photograph, NPS)



Baring Creek bridge has the largest stone-faced concrete arch along the Sun Road. (2002 photograph, NPS)

Small Scale Features

Small scale features give the landscape added character, and reinforce the general feeling created by the major character-defining elements of the landscape. They generally provide for functional needs, but also play an aesthetic role. Their importance comes from a collective contribution to the landscape, as each individual feature probably wouldn't be considered significant in its own right. These elements can include, but are not limited to, fences, benches, monuments, signs, cow paths, curbstones, culverts, and minor ruins.

Along Going-to-the-Sun Road, these elements include barrier stones, log guardrail, log curbing, signs, pullouts, culverts and related headwalls,and culvert spillway paving.

Barrier stones consist of rows of large boulders placed along the roadway shoulder, either to prevent roadside parking or to serve a protective function. They saw limited use along the Sun Road during the historic era; some were placed along Siyeh Bend, for example. The use of these stones has increased in recent years, and nearly all of the current barrier stone locations are modern.

Removeable guardrail has been used for decades in areas subject to avalanche damage, and was designed to be removed during winter months to protect it from damage. The current design dates from the 1960's. This rail consists of ten-foot lengths of timber rail supported by pairs of I-Beam verticals, and is not considered visually compatible with historic designs for the road.

Log guardrail ("Type 7"), with brown-painted round logs supported by timber verticals, was used during the historic period. While no original examples of this rail survive, rehabilitation

projects undertaken in the 1990s reintroduced this type of rail to the road corridor. Log curbing was also installed at pullouts in the McDonald Creek valley.

Pullouts were historically constructed at important viewpoints, as space allowed. Many of these pullouts are bounded by masonry guardwall, thus confirming their existence from the inception of the road. Corrugated metal culverts were constructed along with the road to provide drainage during the historic period; many of these have stone headwalls that are visible from the road. Stone culvert spillway paving was constructed on the upstream side of many culverts to prevent erosion.

An important small-scale feature that has changed significantly from the road's historic period is informational signage. Numerous signs identifying nearby mountains or on-road place names formerly existed along the road, especially at major turnouts. However, these have now almost wholly disappeared. Furthermore, current signs are not the same as the historical style, being generally of metal with reflective lettering on metal posts. Historically the signage along the road was of wood with routed lettering; the last of these signs were removed from Glacier in the 1980s.

During the historic period, there may have been a viewfinder near the comfort station at Logan Pass. This viewfinder would have had a stone base topped by a metal plaque that indicated the names of surrounding peaks. Although a plan was created for this viewfinder, and subsequent plans of Logan Pass indicate its existence, no definitive evidence of its construction can be found. Also, initial construction plans for the road indicate drinking fountains at key locations. Again, no post-construction evidence of their existence can be found.

Character-defining Features:

Feature: Barrier Stones

Feature Identification Number: 99755

Type of Feature Contribution: Contributing

Feature: Culvert Spillway Paving (Stone)

Feature Identification Number: 99756

Type of Feature Contribution: Contributing

Feature: Lack of Guardrail along Segments East of Logan Pass

Feature Identification Number: 99757

Type of Feature Contribution: Contributing

Feature: Log Curbs at Pullouts

Feature Identification Number: 99759

Type of Feature Contribution: Non-Contributing

Feature: Pullouts bounded by Historic Walls

Feature Identification Number: 99760

Type of Feature Contribution: Contributing

Feature: Log "Type 7" Guardrail

Feature Identification Number: 99758

Type of Feature Contribution: Non-Contributing

Feature: Removeable Guardrail (Timber with I-Beam Supports)

Feature Identification Number: 99761

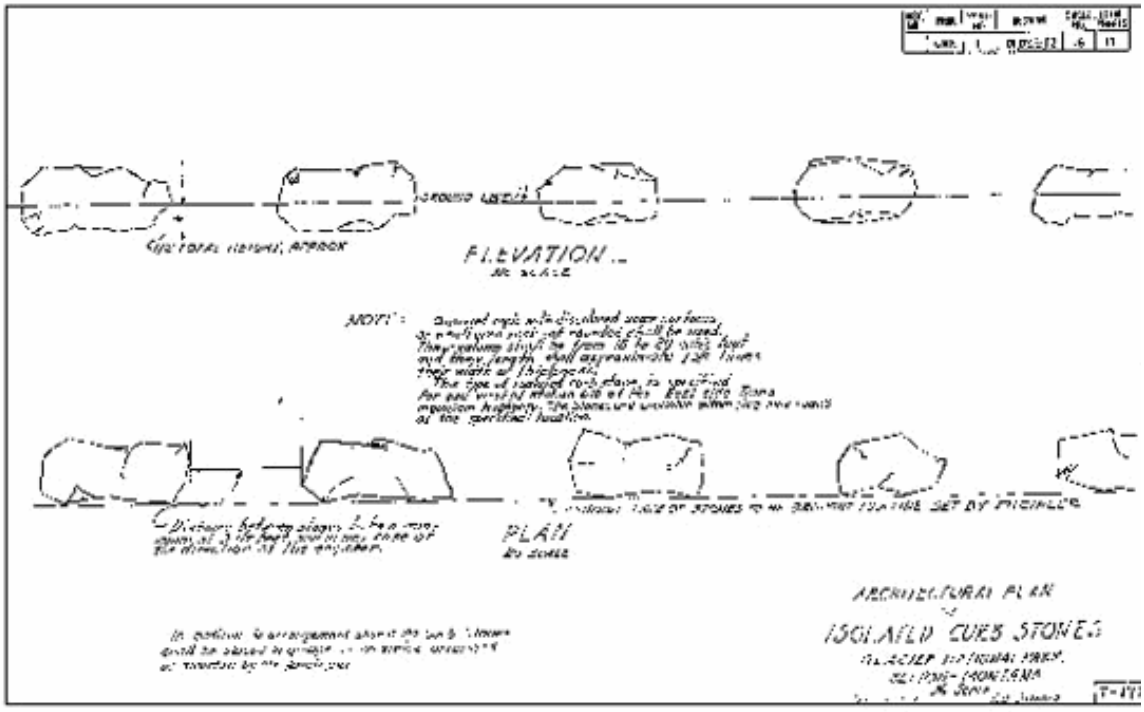
Type of Feature Contribution: Non-Contributing

Feature: Small Stone Culvert Headwalls

Feature Identification Number: 99762

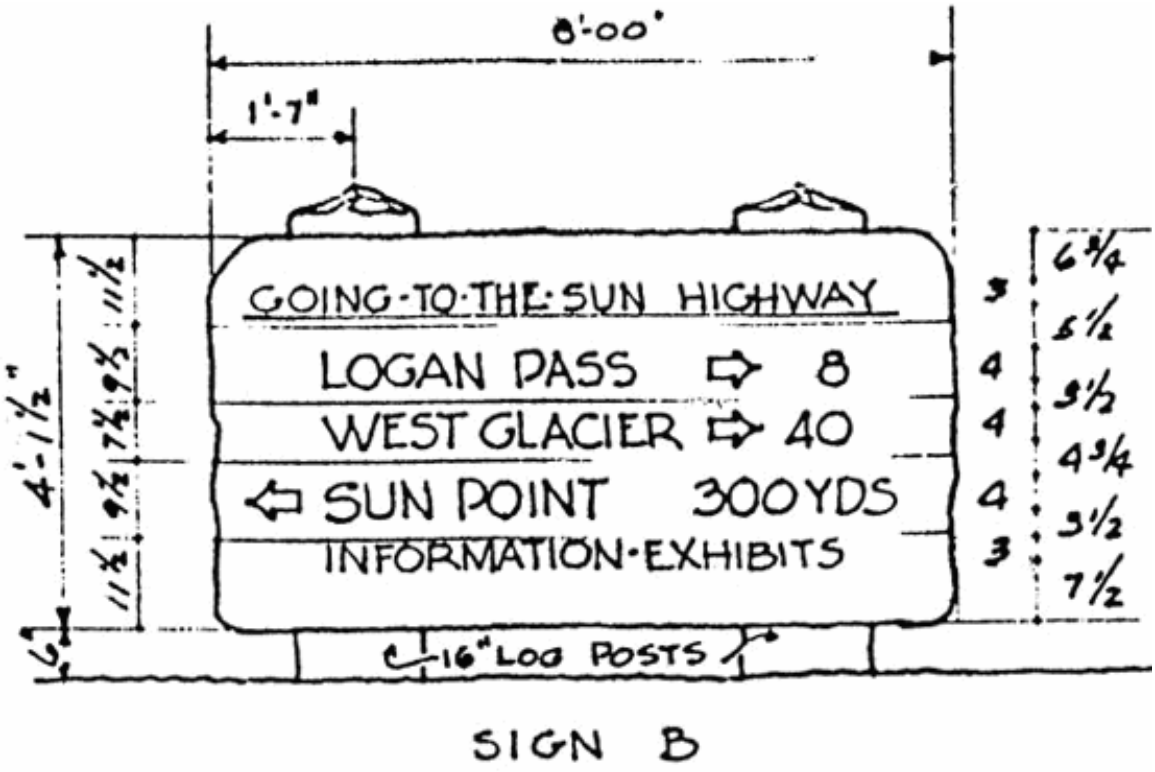
Type of Feature Contribution: Contributing

Landscape Characteristic Graphics:



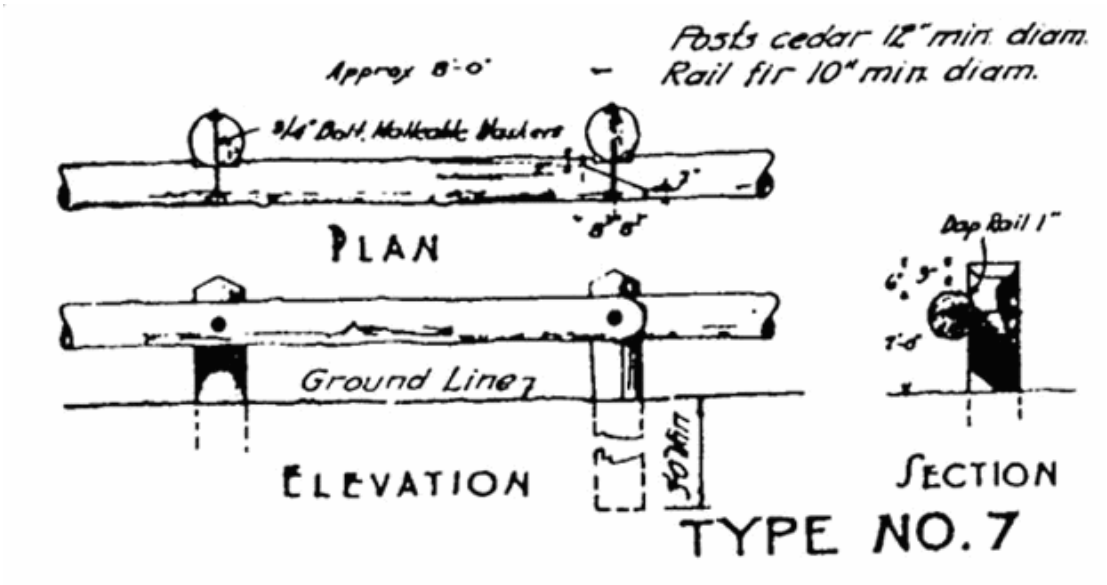
Historic (1939) NPS drawing specifying placement guidelines for barrier rocks along the Going-to-the-Sun Road. (TIC drawing number 1835)

Culvert spillway paving adjacent to the road near Siyeh Creek. (2002 photograph)



NPS drawing showing the type of signage used on the Sun Road in the mid-twentieth century. The signs were painted wood with routed lettering. (TIC drawing 2356A)

Type 7' log guardrail replaced in the 1990s. (2002 photograph)



Type 7 log guardrail 1931 plan. (TIC drawing 9390)

Lack of guardrail on sections east of Logan Pass contribute to the road's rustic feeling. (2002 photograph, NPS)

Corrugated culvert inlet along Lake McDonald. (2002 photograph, NPS)

Small stone culvert headwall, near Siyeh Creek. (2002 photograph, NPS)

Culvert spillway paving near Lake McDonald. (2002 photograph, NPS)

Views And Vistas

One of the primary considerations during design and construction of Going-to-the-Sun Road was maximizing the driver's view of Glacier's scenery. Goodwin located the route along Lake McDonald along its west shore to emphasize views up the lake. Regarding Frank Kittredge's 1924 survey of the upper portions of the road, Thomas Vint said in a 1925 memo "that the purpose of the road is primarily for the use of tourists and is a means to display to them the park scenery" and its "route should include both the practical means of making this grandeur accessible and the dramatic values in displaying it." Kittredge included in his survey report a three-page description of scenic features along the proposed route.

These features included the "highly timbered country along McDonald Creek," with "views through the timber of creek and distant mountains." Further along, he devotes several paragraphs on the progressively-heightening views of the McDonald valley and surrounding peaks as one proceeds from the Loop over the Garden Wall to Logan Pass. At North Fork Gulch (mile 6 of his plan), viewers can "look down and into a cataract a thousand feet or more in height -- the whole surmounted by the wonders of the Garden Wall and the Continental Divide rising abruptly 5000' above the road." The road itself, built along the steep mountainside above the valley floor, was also called out as a scenic feature forming "an appropriate and

harmonious setting from which to view the distant grandeur of Heavens' Peak, the Mt. Kip region, and closer at hand the walls of Mt. Cannon." He indicated a point just below the summit of Logan pass that provides "a comprehensive view of the mountainside supporting the road," and shows "much of the 11 miles of road required to reach the valley floor 3400' below." From Logan's summit, he said, "a typical view is had of the Continental Divide country in the park -- high mountains, precipitous peaks, cirques, glaciers and cascades." Just east of the summit, he identified a point from which to view the Hanging Gardens and the Reynolds Creek valley "flanked by some of the highest and most precipitous mountains in the Park." Kittredge also felt the view of this valley is most impressive from the shelf along which the East Side Tunnel is located, his impression being more "that of seeing the country from an aeroplane than from the ground." Looking westward from this point the viewer would be "confronted with cascades more than 1000' in height" framed by several peaks and the Hanging Gardens.

Vint, in his 1925 memo, described the road's scenic features more simply. West of Logan Pass, he said, the tourist would first be "shown the largest of the Park's mountain lakes, then a mountain stream in all its stages as it diminishes in size, and as the valley floor is left behind he passes through the several types of forest growth until finally above timberline the great vistas of mountain scenery are brought before him." East of Logan Pass, "we find the same types of scenery on descending as on the west side, great vistas of high mountain scenery, then the forest types of different altitudes and finally a mountain lake." Vint's only change to Kittredge's route was near Sun Point, where he requested the road be relocated back from the shore line to provide a panoramic view of the lake as one emerged from the timber.

In a 1935 memo to the Chief of the Branch of Plans and Design in San Francisco, Glacier's then Superintendant Scoyen indicated a desire to work out "a number of carefully selected and well developed parking areas along the highway" to "encourage the average motorist to see the country he is actually traveling through." He preliminarily identified views of Triple Divide Mountain and Blackfoot (Jackson) Glacier as "intenseley interesting." However, any study that resulted from this request has not been located. Also, Scoyen wanted to establish a "scenic locator" at Logan Pass to aid visitors in identifying surrounding peaks. Although several subsequent plans were created for a "viewfinder," and later drawings of Logan Pass indicate proposed locations,this feature does not seem to have been built.

While travelers on the highest portions enjoy nearly uninterrupted and expansive vistas, the availability of such views at other locations is often dependent on breaks in the vegetative cover. In many locations the amount of this cover has been increasing, degrading the vistas available from the road. On the western approach to Logan Pass, the forest fires of 1929 (near Lake McDonald), 1936 (near the Loop) and 1967 (along the Garden Wall) resulted in relatively open vistas for most of the road's history. Clearings created by the 1967 fire are now fading, however, resulting in a diminished viewshed from several vista points.

Recognizing this issue, the NPS over the years has conducted vista clearing operations at a variety of important viewpoints along the road, including Jackson Glacier Overlook, several

Lake McDonald locations, and elsewhere. This work has generally been intermittent and sporadic, and no comprehensive vista clearing program for the road has been established. However, there is no indication that views opened by road clearing and fires were either envisioned or specified by the road's designers. Consequently their filling-in does not have a material effect on the "as-designed" condition of the road.

Contributing features derived from the road designer's descriptions follow, with the source indicated in parenthesis.

Character-defining Features:

Feature: Bird Woman Falls -- view from overlook across McDonald Creek Valley (Kittredge)

Feature Identification Number: 99772

Type of Feature Contribution: Contributing

Feature: Garden Wall -- views of this feature from road along McDonald Creek (Kittredge)

Feature Identification Number: 99773

Type of Feature Contribution: Contributing

Feature: Jackson Glacier -- view from adjacent overlook (Supt. Scoyen)

Feature Identification Number: 100220

Type of Feature Contribution: Contributing

Feature: Lake McDonald -- views across lake to surrounding peaks (Kittredge, Vint)

Feature Identification Number: 100221

Type of Feature Contribution: Contributing

Feature: Logan Pass -- views of surrounding peaks (Kittredge, Vint)

Feature Identification Number: 100222

Type of Feature Contribution: Contributing

Feature: McDonald Falls -- view from adjacent pullout (Vint, and indicated by masonry guardwalls)

Feature Identification Number: 100224

Type of Feature Contribution: Contributing

Feature: McDonald Valley -- views of valley from Garden Wall (Kittredge)

Feature Identification Number: 100225

Type of Feature Contribution: Contributing

Feature: Heaven's Peak -- view from The Loop (Vint, as indicated by plan drawings)

Feature Identification Number: 99775

Type of Feature Contribution: Contributing

Feature: Triple Divide Peak -- views from road and pullout (Supt. Scoyen)

Feature Identification Number: 100229

Type of Feature Contribution: Contributing

Feature: St. Mary Lake -- views across lake, especially at point road emerges from trees when travelling east (Kittredge, Vint)

Feature Identification Number: 100228

Type of Feature Contribution: Contributing

Feature: Heaven's Peak -- view from West Side Tunnel Galleries (Kittredge)

Feature Identification Number: 99776

Type of Feature Contribution: Contributing

Feature: Heaven's Peak, the Mt. Kip Region and Mt. Cannon -- views from road along Garden Wall (Kittredge)

Feature Identification Number: 99777

Type of Feature Contribution: Contributing

Feature: Hanging Gardens -- view from pullout east of Logan Pass (Kittredge)

Feature Identification Number: 99774

Type of Feature Contribution: Contributing

Feature: Reynolds Creek Valley -- views of valley from area around East Side Tunnel (Kittredge)

Feature Identification Number: 100226

Type of Feature Contribution: Contributing

Feature: Reynolds Creek Valley -- views of valley from pullout east of Logan Pass (Kittredge)

Feature Identification Number: 100227

Type of Feature Contribution: Contributing

Feature: McDonald Creek -- views through "timber"of creek itself and of distant mountains (Kittredge)

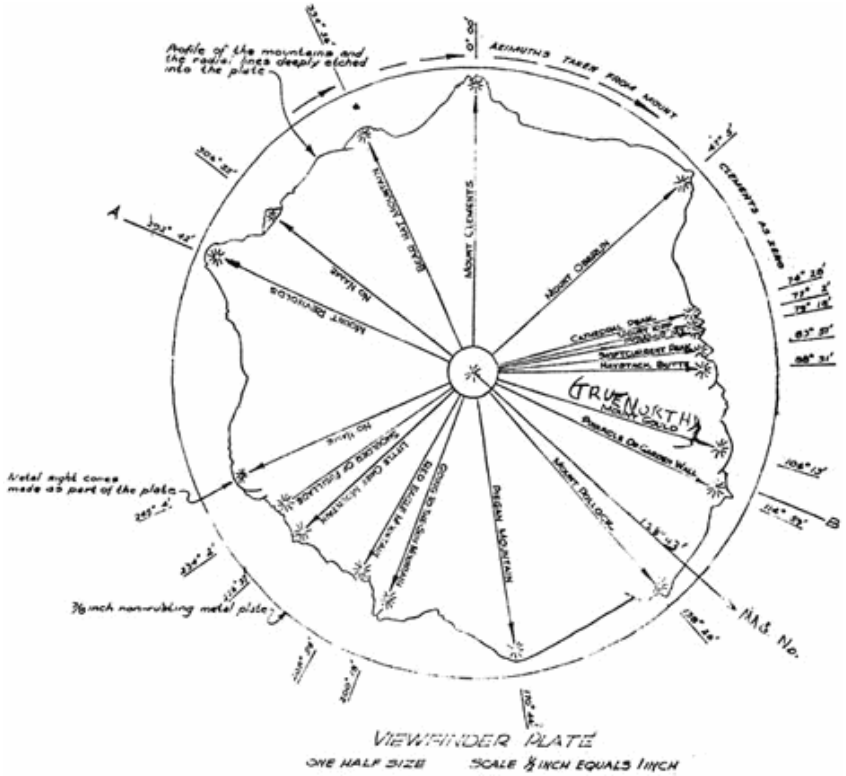
Feature Identification Number: 100223

Type of Feature Contribution: Contributing

Landscape Characteristic Graphics:

View down Lake McDonald Valley, road along Garden Wall, and surrounding peaks from pullout near Logan Pass. (2002 photograph, NPS)

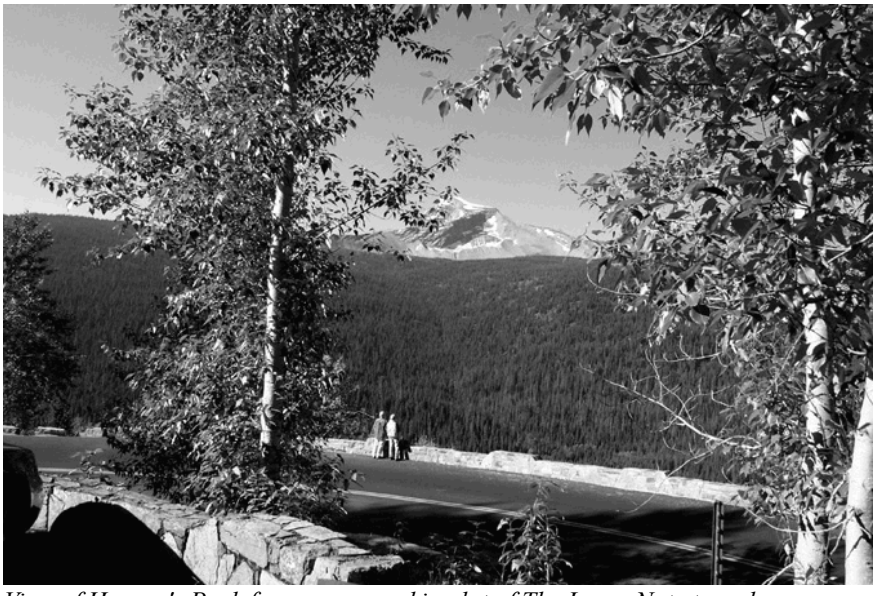
View of Bird Woman Falls from Garden Wall. (2002 photograph, NPS)



Plan (1935) for viewfinder plate at Logan Pass, identifying significant features visible from the viewfinder platform. (TIC drawing 3041)

View of Garden wall through trees along McDonald Creek. (2002 photograph, NPS)

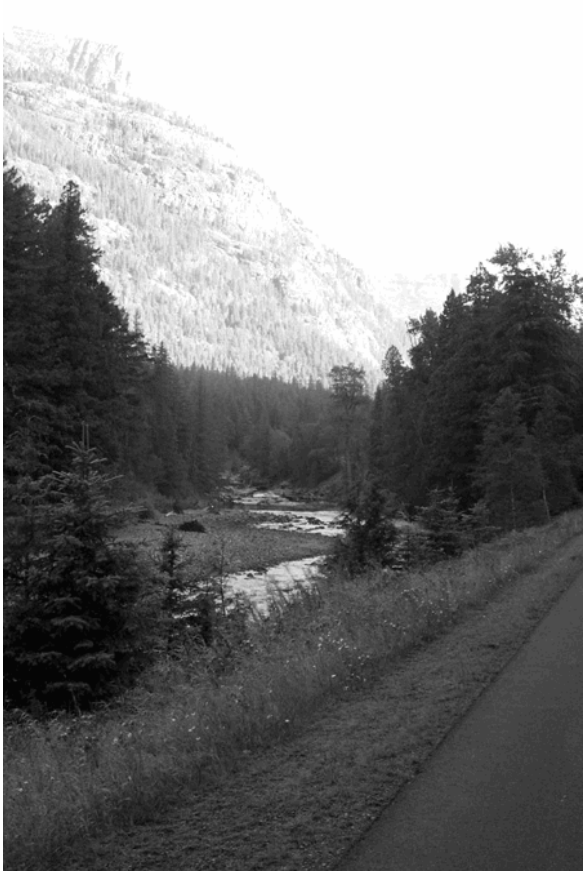
View of Hanging Gardens from pullout east of Logan Pass (2002 Photograph, NPS)



View of Heaven's Peak from upper parking lot of The Loop. Note trees have grown up between road and parking lot, an area for which vegetation was not specified in the original plan. (2002 photograph, NPS)

View of Jackson Glacier from pullout; trees have been thinned to maintain this view. (2002 photograph, NPS)

View across Lake McDonald to surrounding peaks. Vegetation clearing has kept many views across the lake open. (2002 photograph, NPS)



View of McDonald Creek through break in trees, or to use Kittredge's phrase, through the timber."(2002 photograph, NPS)

McDonald Falls from pullout bounded by masonry guardwall. (2002 photograph, NPS)

View of McDonald valley from along Garden Wall. Note road to the left of McDonald Creek. (2002 photograph, NPS)

View down Reynolds valley from pullout east of Logan Pass. (HAER survey photograph MT-67-34)

View east across St. Mary Lake from pullout bounded by masonry wall; Triple Divide Peak is located in mountains to right. Note that view is from above lake, as planned by both Vint and Kittredge. (2002 photograph, NPS)

View across St. Mary Lake toward Logan Pass from Two Dog Flats area. (2002 photograph, NPS)

Vegetation

Vegetation along Going-to-the-Sun Road is integral to the road's winding character and Rocky Mountain setting. It is significant for the spatial feeling and visual display it creates, in some places closing-in, in others either framing or blocking views, sometimes creating cramped damp bowers, other times leaving sun and wildflower filled spaces. Glacier National Park has a

diverse range of plant communities due to its wide variation in elevation and aspect. Because Going-to-the-Sun Road extends from the lowest elevations on both sides of the park up to the Continental Divide, it provides a good sampling of these communities, including prairie, aspen groves, low-elevation forest, subalpine forest, and alpine. Fire has been important to the development of these communities, both within and outside of the road's historic period. It has created clearings associated with the road's expansive views, allowed the forest to renew itself, and created mosaic of coniferous plant communities in forested areas. Likewise, the 30 to 60 foot wide corridor cleared during the road's construction opened up views that would otherwise not have been available, but became associated with the road. Despite Park efforts to maintain clearings, many of them have been replaced with vegetation stands and their associated views blocked.

Plant communities along the road help define roadside character, and include:

Prairie along Two Dog Flats, about four miles from the park's east entrance, contains grasses and herbaceous species found on the prairie of southwestern Alberta and the Palouse prairie of Washington, Oregon, and western Idaho.

Aspen groves surround Two-Dog Flats, as east of the Continental Divide they commonly intermingle with prairie areas to form extensive parklands. West of the Divide, aspen stands are small and usually associated with stream corridors or depressions on slopes otherwise dominated by conifers.

Low-elevation forest communities in the McDonald Creek Valley are more typical of those found in coastal Washington and Oregon. This is due to the Valley's comparatively low elevation, its large lake that moderates both winter and summer temperatures, and influxes of moisture-laden Pacific air dropping quantities of rain and snow. The climax community for this area, redcedar-hemlock forest, lies between the head of Lake McDonald and Avalanche Creek, which represents the eastern limit of this forest community's range. Although several redcedar-hemlock tree stands are more than 400 years old, small fires over the past few centuries – including the 1929 Half Moon fire near Apgar – have resulted in a mosaic of successional species that include Douglas-fir, western white pine, Engelmann spruce, and subalpine fir.

Subalpine (lower) areas above 4,000 feet, but below 6,000 feet, contain extensive forests of spruce-fir and lodgepole-larch communities. The most common trees found in this zone include lodgepole pine, western larch, Douglas-fir, Engelmann spruce, subalpine fir, whitebark pine, limber pine, and alpine larch.

Subalpine (upper) areas above 6,000 feet, but below treeline, have trees with increasing signs of stunting caused by strong winds, winter drought, and a short growing season. Trees on the most exposed sites are stunted and dwarfed due to ice-scouring wind or heavy snow accumulations, a condition known as "krummholz." Logan Pass, at 6,640 feet, lies just below treeline and is

characterized by islands of stunted subalpine fir. Meadows in this area are considered subalpine, even though they contain alpine species. Plant communities represented here are: “dry meadows” blanketing gentle slopes and rock ledges, “wet meadows” bordering streams and poorly drained areas, “heath-moss” in the wettest depressions, and “fellfield” growing in rocky areas where soils are thin. Meadow wildflowers include heather gentian, beargrass, and glacier lily. East of the Logan Pass, where the mountains give way to plains, pasque flower, lupine, Indian paintbrush, gaillardia, asters, and shooting stars predominate.

The historic condition of the roadside, because of fire and construction activity, in general was less vegetated. The 1929 Half Moon fire at the foot of Lake McDonald made lake views more accessible to automobile tourists. In 1936, the Heaven’s Peak fire burned the Loop area, leaving the area mostly treeless and opening up wide views. A fire in 1967 burned the west side of the Garden Wall, resulting in expansive views from the road. However, these were not the only fires affecting roadside character. Small fires in the Lake McDonald Valley were relatively common in past centuries. These left a mosaic of forest communities, and resulted in a diverse mix of plant communities. Likewise, construction activities resulted in relatively open views in areas that historically were densely vegetated. Although construction managers were concerned with preserving vegetation, crews inevitably cleared "brush" and trees in a 30 to 60 foot wide corridor. Much of this vegetation has grown back. This is true especially at lower elevations and along the lakeshores, where various species of trees and shrubs can grow into a thick visual barrier. However, at higher elevations, vegetation rarely becomes a factor as portions of the road around Logan Pass are above treeline.

Although there can be no question of the importance of scenic views in the planning, design, and original conception of the road, historical documentation rarely offers specific guidance for the management of vegetation on roadsides. Roadside pullouts were obviously planned to exploit certain views, and views opened up by fires and clearing efforts became associated with the road by park visitors. As vegetation has re-established in these areas, park employees have had to develop management policies. On some lakeside portions, for example, certain trees have been limbed up, allowing tree-trunks to frame views. However, there is no evidence that links this effect mimics the historic period.

Overall, the impact of increased vegetation on the scenic integrity of the road has been limited to certain areas, and should not be considered an overly significant impact on the road's historic integrity.

Character-defining Features:

Feature: Prairie plant community surrounded by aspen groves along lower St. Mary Lake (referred to as Two Dog Flats)

Feature Identification Number: 99768

Type of Feature Contribution: Contributing

Feature: Redcedar-hemlock forest community in Lake McDonald Valley

Feature Identification Number: 99769

Type of Feature Contribution: Contributing

Feature: Subalpine forest communities both east and west of Logan Pass containing lodgepole pine, western larch, Douglas-fir, Engelmann spruce, subalpine fir, whitebark pine, limber pine, and alpine larch, with interspersed aspen groves.

Feature Identification Number: 99770

Type of Feature Contribution: Contributing

Feature: Subalpine/alpine plant communities around Logan Pass, typically meadows interspersed with Krummholz

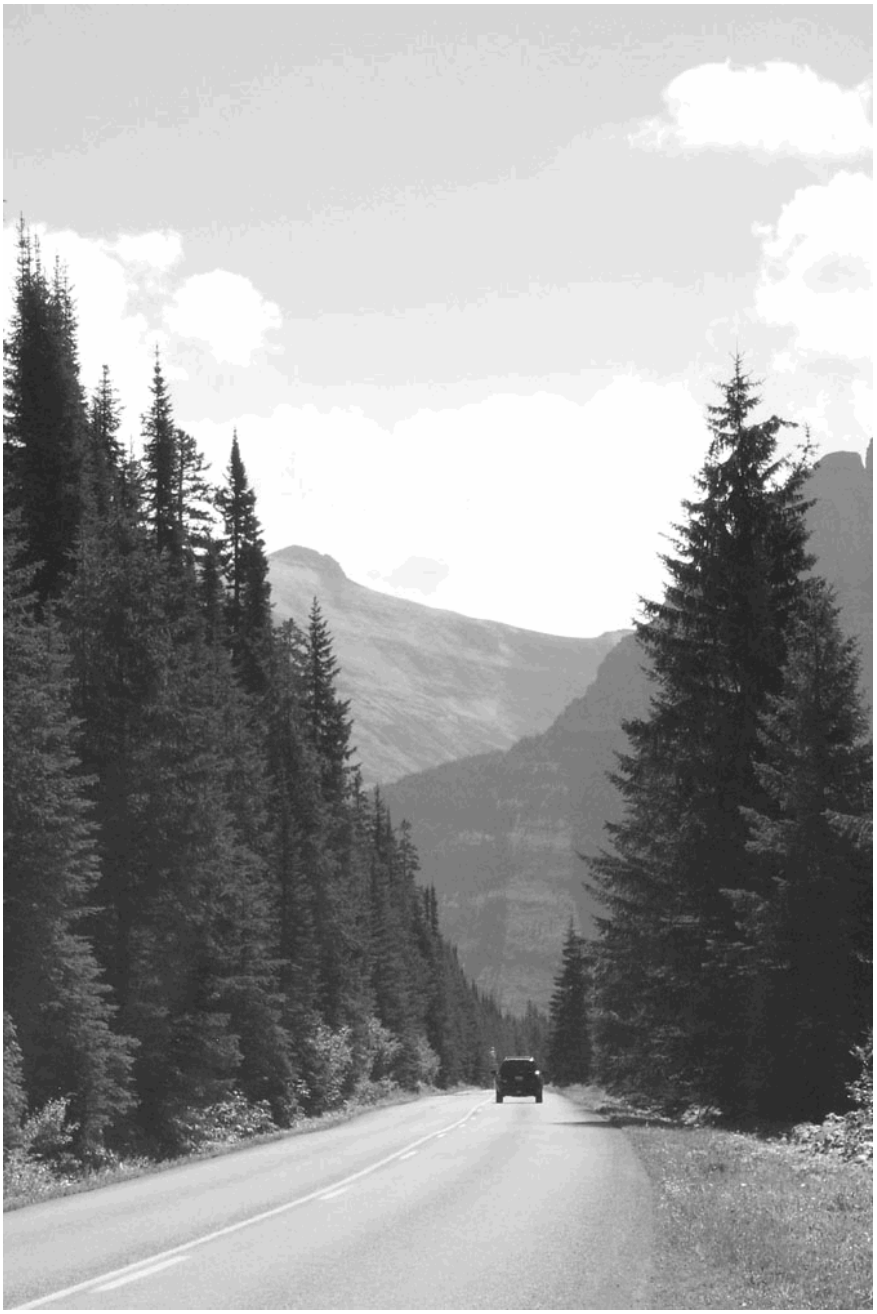
Feature Identification Number: 99771

Type of Feature Contribution: Contributing

Landscape Characteristic Graphics:

Prairie plant community around Two Dog Flats, along St. Mary Lake. (2002 photograph)

Redcedar-hemlock forest in the McDonald Creek valley usually forms a dense wall of vegetation along the road. (2002 photograph)



Subalpine forest both east and west of Logan Pass, although dense, provides fairly open views due to pyramidal shape of trees. (2002 photograph)

Vegetation around Logan Pass is characterized by sub-alpine meadows and Krummholz, providing an open character to the road. (2002 photograph)

Condition

Condition Assessment and Impacts

Condition Assessment: Poor

Assessment Date: 08/31/2001

Condition Assessment Explanatory Narrative:

In 1999, Glacier National Park adopted a General Management Plan (GMP) to guide the management of the park for the next 20 years. Preservation and maintenance of the Road was one of the key priorities identified in the GMP. An Advisory Committee was established by authority of the Secretary of the Interior under Section 3 of Public Law 91-383 (16 U.S.C. 1a-2c) to review the rehabilitation alternatives and advise the park on the best course of action for rehabilitation of the Road.

This group stated in its 2001 Engineering Study that "time is of the essence for addressing the critical needs of the Going-to-the-Sun Road. Current conditions dictate that now is the time to slow and stop the deterioration of the Road and safeguard its historical features. Rehabilitation efforts must be expedited in order to assure the integrity of this landmark Road." The report goes on to say "conditions dictate that critical repairs are needed now and the rate of road deterioration is increasing."

Drainage and hydraulic improvements are the most urgent need, as many areas of the roadway and retaining walls continue to degrade as a result of inadequate drainage.

Condition Assessment: Poor

Assessment Date: 07/17/2006

Condition Assessment Explanatory Narrative:

Superintendent concurrence 8/3/2006. The park has a major project funded to improve the condition of the Going-to-the-Sun Road Historic District.

Condition Assessment: Poor

Assessment Date: 06/14/2011

Condition Assessment Explanatory Narrative:

Approximately $80 million has been spent rehabilitating the 50-mile-long Going-to-the-Sun Road since 2007. FHWA just awarded an additional $12 million project to rehabilitate the Haystack to Big Bend section. Rehabilitation of the alpine section of the road continues with one section (between the West Tunnel and Haystack Creek complete and three additional sections nearing completion. Still remaining to be rehabilitated are 17 miles on the east side and 18 miles on the west side, including the repair of a number of significant historic bridges and culverts. The landscape remains in poor condition. Superintendent concurrence on the poor condition was received 6/14/2011.

Stabilization Measures:

Stabilization measures for the road have been ongoing for the past two decades. Park management continues to collaborate with the Federal Highway Administration, and is working and/or planning to

rehabilitate several deteriorated features including retaining walls, Triple Arches, and Crystal Point Arch. Other stabilization measures, such as drainage improvements, have been included in a rehabilitation proposal for the road and are expected to be completed within the next eight years.

Impacts

Type of Impact: Improper Drainage

External or Internal: Internal

Impact Description: Rehabilitation, maintenance, and the addition of necessary drainage facilities are considered a high priority throughout the length of the Road. Road damage resulting from water intrusion into the highway pavement and base is especially evident in the Alpine Section. The 2001 Engineering Study has identified areas of repeated debris accumulation and the difficulty experienced in removing this debris from drainage ditches, inlets and culverts. Also, Logan Creek Bridge, Haystack Creek Bridge, and Divide Creek Bridge all have high bed loading, which restricts flow. Corrections to drainage will be costly and critical areas should be addressed as soon as practical. Areas not deemed immediately critical should be incorporated into other rehabilitation efforts in the same location.

Type of Impact: Other

Other Impact: Slope Stability

External or Internal: Internal

Impact Description: Slope stability issues include slump failures, slope undercutting, unstable slopes above and below the Road, and avalanche chutes. Stabilization of slopes is considered a high priority throughout the length of the Road. Most all of the stabilization methods require the scaling of rock and debris from slopes above the Road.

Slump failures are generally limited to colluvium deposits and weakened fill sections adjacent to or underlying the roadway. Only a few notable slump areas were observed along the roadway.

Slope undercutting of the roadway, due to soil raveling and shallow sloughing, occurs in a number of locations where steep slopes exist below the Road, especially in the higher elevations. This condition contributes to the weakening or failure of

guardwall and retaining wall foundations and to loss of pavement and roadway width.

Rockfall hazards due to unstable slopes above the Road are considered a serious safety issue throughout most of the alpine section, extending from about one mile west of the West Tunnel to two miles east of Siyeh Bend. Rockfall hazards are also present in several limited locations along the east approach sections.

Steep, unstable soil cuts lie immediately above the Road in several locations. These soil cuts are subject to erosion, which is undercutting the ground surface at the top of the cuts. Such erosion also causes boulders to be eroded out from the soil material, leaving them free to tumble down the slope and onto the Road.

Avalanches are pervasive throughout the alpine area and continue to have an adverse effect on the Road and its features.

Type of Impact: Structural Deterioration

External or Internal: Internal

Impact Description: Certain retaining walls are considered damaged beyond practical repair due to failed foundations, water intrusion, and stone displacement. Portions of these walls must be rebuilt and FHWA will complete the work within the next two years. In many instances the upper three to eight feet of the remaining retaining walls are in distress, with missing or loose stones and crumbling mortar.

Type of Impact: Structural Deterioration

External or Internal: Internal

Impact Description: A majority of the stone guardwalls are leaning away from the Road or have been outwardly displaced from the roadway due to poor drainage, inadequate foundations, settling, avalanche and snow weight pressures, and poor maintenance practices. The general condition of two-thirds of the guardwalls is considered poor, and the repair and reconstruction of certain sections – especially those at milepost 32 – is considered a high priority.

Type of Impact: Structural Deterioration

External or Internal: Internal

Impact Description: Crystal Point Arch exhibits advanced stages of failure, and due to safety considerations, repair is considered critical. The FHWA has identified this as a priority, and scheduled repairs.

Type of Impact: Structural Deterioration

External or Internal: Internal

Impact Description: Triple Arches exhibits deteriorating supports and guardwall sections. Emergency corrective action has been taken by FHWA to shore up the weakened bearing rock support columns with steel I-beams to shore up the weakened bearing rock support columns. The design is complete for the remaining repair, which will replace the beams with rock bolting and restore the natural appearance. Additional stabilization efforts may be warranted in the near future to further shore up the structural bearing capacity of the retaining walls, adjacent rock stratum, and other structural elements, and to rehabilitate the guardwall sections.

Type of Impact: Exposure To Elements

External or Internal: Internal

Impact Description: Almost all of the mortared walls exhibit some degree of joint and mortar deterioration, which can result in additional moisture intrusion.

Type of Impact: Removal/Replacement

External or Internal: Internal

Impact Description: Some of the stone guardwalls appear to have been reconstructed or repaired with a mortar consisting of fine sand, such as would be used for brick or concrete masonry work. This mortar has almost no strength, and can be readily crumbled by hand. The original mortar was constructed of native sands and contains red and blue pebbles about one-eighth inch in diameter. In general the original mortar is in fair condition except for the surface joints that have been exposed to weathering and vegetation.

Type of Impact: Vegetation/Invasive Plants

External or Internal: Internal

Impact Description: In many instances, retaining walls and guardwalls have vegetation growing in the mortar, which indicates soil

contamination and moisture intrusion.

Type of Impact: Removal/Replacement

External or Internal: Internal

Impact Description: The original retaining walls that were replaced with stone veneered concrete are not historically appropriate. However, it is not prudent to remove and replace these walls just to make them historically accurate, and the finished appearance has been acceptable to the State Historical Preservation Officer. However, the stone veneer on some of these walls has not been completed. Completion of this veneer is recommended so that the reconstruction is less noticeable.

Type of Impact: Removal/Replacement

External or Internal: Internal

Impact Description: Current sawed timber rail and steel post removable guardrail is not of the historical design, and not compatible with the road's historic character. Furthermore, existing rail has been found to be structurally inadequate and replacement is recommended. An acceptable alternative is avalanche-resistant Type II stone guardwall. Round-log guardrail designs have been historically used in some locations, and were reintroduced to some sections of the road in the 1990's. The reuse or adaptation of this design may be considered in areas not subject to avalanches.

Type of Impact: Removal/Replacement

External or Internal: Internal

Impact Description: Temporary concrete barriers, commonly called Jersey Barriers, have been placed at several locations where the original guardwall is missing. These non-historic barriers offer an effective interim measure for traffic control and provide a barrier until a historically appropriate barrier can be installed.

Type of Impact: Exposure To Elements

External or Internal: Internal

Impact Description: Original paving, in general, called for four inches of 3/4-inch minus base course over the top of four inches of 1 ½-inch minus sub-base. This material was compacted, without benefit of additional water, by driving the haul trucks over the placed material. This operation created additional fines within these two

layers, which have allowed drainage to seep through.

As a result, excessive voids have occurred, with subsequent settling and failure of the roadway and shoulders. Various stages of road distress have been noted on about half of the Road, between milepost 16 and milepost 43, including surface chipping, longitudinal and transverse cracking, rutting, shoulder raveling, shoulder and edge-of-road subsidence, alligator cracking, and surface treatment (patching) to correct for settlement.

Road sections in rock cut areas are generally quite stable with only surface deterioration. Road sections through geotechnically unstable areas of colluvial deposits will likely require extensive stabilization and reconstruction work to correct structural and surface deficiencies. Many of the turnouts and parking areas are badly cracked and rutted or chipped due to the absence of a proper roadbase. Certain shoulder areas are raveled and affected by erosion and weathering.

Type of Impact: Other

Other Impact: Paving Encroachment

External or Internal: Internal

Impact Description: Many of the stone guardwalls have been encroached upon by pavement overlays or patching. This results in the walls not being high enough in many places to serve their intended purpose of keeping errant vehicles from leaving the roadway. The low walls also may pose a safety issue for pedestrians at pullouts. In some cases the distance from the top of the roadway to the top of the guardwall is as little as six inches, rather than the original 18 to 24 inches.

Type of Impact: Deferred Maintenance

External or Internal: Internal

Impact Description: Proper maintenance of the Road is imperative to protect capital investments, preserve the historic nature of the roadway, and enhance the visitor experience. It was noted during the field reconnaissance that most of the Road's facilities are suffering from lack of proper maintenance. Drainage structures are plugged with debris and have fallen into disrepair; guardwalls and retaining walls have crumbled and shifted; roadway and pavement sections have deteriorated with extensive cracking and slumping in certain areas, and rockfall and other potential hazards

have been left
unattended. The park has comprehensive operations and maintenance plans to address these issues; however, it does not have the funding allocation to carry out these plans.

Stabilization Costs

Landscape Stabilization Cost: 8,428,000.00

Cost Date: 08/31/2001

Level of Estimate: B - Preliminary Plans/HSR-CLR

Cost Estimator: Park/FMSS

Landscape Stabilization Cost Explanatory Description:

The LCS has identified stabilization and treatment costs of $0 for structures listed along the Going-to-the-Sun Road. Most of the structures are listed in fair condition and low impact levels, with an evaluation date of 1999.

Landscape stabilization costs have been detailed in agreements between the FHWA and Glacier National Park. Projects associated with these costs are identified as either emergency or priority, and slated to be completed between 2002 and 2004. Projects areas include east Logan Pass, Oberlin Bend, Triple Arches, Swede's Point, the West Side Tunnel, Crystal Point, and the Haystack Creek culvert.

Treatment

Treatment

Approved Treatment: Rehabilitation

Approved Treatment Document: General Management Plan

Document Date: 04/30/1999

Approved Treatment Document Explanatory Narrative:

Since the major structural elements of the Going-to-the-Sun Road were completed in 1932, the road's upper reaches have not been substantially repaired or rehabilitated. As a result, recent engineering studies have defined 11 major work elements as needing to be performed. These elements include: improving drainage, addressing slope stability issues, repairing retaining walls and guardwalls, resurfacing the roadway, and considering minor roadway alignment and width adjustments at sites with safety issues.

Approved Treatment Completed: No

Approved Treatment Costs

Landscape Treatment Cost: 81,400,000.00

Cost Date: 04/30/1999

Level of Estimate: B - Preliminary Plans/HSR-CLR

Cost Estimator: Contractor

Landscape Approved Treatment Cost Explanatory Description:

These costs are estimates from the List of Classified Structures (LCS), the Going-to-the-Sun Cultural Landscape Report (CLR), and the Going-to-the-Sun Road Engineering Study (ES) prepared by Washington Infrastructure Services under the direction of the Going-to-the-Sun Road Advisory Committee.

The LCS and the CLR did not specify costs for the approved treatment. The ES was prepared in 2001, and included five alternatives for rehabilitating the Sun Road. The approved treatment cost presented above represents the cost estimate for the report's preferred alternative, "Comprehensive Shared Use." Estimates for the other alternatives range from $72,200,000 to 97,700,000.

Costs are presented in 2001 dollars and include all work necessary to complete the rehabilitation, except for the FHWA-designed retaining walls scheduled for completion prior to 2004. Details of the cost estimates can be found in Appendix B of the ES.

Bibliography and Supplemental Information

Bibliography

Citation Author: Renewable Technologies, Inc.
Citation Title: Cultural Landscape Report
Year of Publication: 2002
Source Name: Other
Citation Type: Both Graphic And Narrative
Citation Location: Cultural Resources Files, Intermountain Region Support Office, NPS, Denver

Citation Author: Washington Infrastructure Services
Citation Title: Going-to-the-Sun Road Engineering Study
Year of Publication: 2001
Source Name: Other
Citation Type: Both Graphic And Narrative
Citation Location: Going-to-the-Sun Road Advisory Committee Website at http://www.nps.gov/glac/gtsr/advisory/resources.htm

Citation Author: Renewable Technologies, Inc.
Citation Title: Cultural Landscape Inventory
Year of Publication: 2001
Source Name: Other
Citation Type: Both Graphic And Narrative
Citation Location: Cultural Resources Files, Intermountain Region Support Office, NPS, Denver

Citation Author: Glacier National Park
Citation Title: Final General Management Plan and Environmental Impact Statement: Glacier National Park
Year of Publication: 1999
Source Name: DSC/TIC
Citation Type: Both Graphic And Narrative
Citation Location: NPS, Denver Service Center

Citation Author:	McClelland, Linda Flint
Citation Title:	Building the National Parks: Historic Landscape Design and Construction
Year of Publication:	1998
Citation Publisher:	Baltimore: Johns Hopkins Press
Source Name:	Library Of Congress/Dewey Decimal
Citation Number:	SB482.A4 M3 1998
Citation Type:	Narrative
Citation Location:	Cultural Resources Library, Intermountain Region Support Office, NPS, Denver

Citation Author:	Begley, Susan and Ethan Carr
Citation Title:	Going-to-the-Sun Road National Historic Landmark Nomination
Year of Publication:	1996
Source Name:	Other
Citation Type:	Both Graphic And Narrative
Citation Location:	Cultural Resources Files, Intermountain Region Support Office, NPS, Denver

Citation Author:	Glacier National Park
Citation Title:	Going-to-the-Sun Road Design Guideline/Cultural Resource Plan (Draft)
Year of Publication:	1995
Source Name:	Other
Citation Type:	Both Graphic And Narrative
Citation Location:	Glacier National Park

Citation Author:	Rockwell, David B.
Citation Title:	Glacier National Park: A Natural History Guide
Year of Publication:	1995
Citation Publisher:	Boston: Houghton Mifflin
Source Name:	Library Of Congress/Dewey Decimal
Citation Number:	QH105.M9 R63 1995
Citation Type:	Both Graphic And Narrative
Citation Location:	Denver Public Library

Citation Author:	Steen, Kathryn et al.
Citation Title:	Going-to-the-Sun Road: HAER MT-67 [also individual reports on specific features along the road]
Year of Publication:	1992
Source Name:	HAER
Citation Type:	Graphic
Citation Location:	Library of Congress Prints and Photographs Division

Citation Author:	Glacier National Park
Citation Title:	Going-to-the-Sun Road Cultural Resource Plan (Draft)
Year of Publication:	1991
Source Name:	DSC/TIC
Citation Type:	Both Graphic And Narrative
Citation Location:	NPS, Denver Service Center

Citation Author:	Kokkas, Panos
Citation Title:	National Historic Civil Engineering Landmark Nomination Form: Going-to-the-Sun Road
Year of Publication:	1985
Source Name:	DSC/TIC
Citation Type:	Both Graphic And Narrative
Citation Location:	Glacier National Park

Citation Author:	Historical Resource Associates
Citation Title:	Going-to-the-Sun Road National Register Nomination
Year of Publication:	1983
Source Name:	Other
Citation Type:	Both Graphic And Narrative
Citation Location:	Cultural Resources Files, Intermountain Region Support Office, NPS, Denver

Citation Author:	Newell, Alan S., David Walter, and James R. McDonald
Citation Title:	Historic Resource Study, Glacier National Park and Historic Structures Survey
Year of Publication:	1980
Source Name:	DSC/TIC
Citation Type:	Both Graphic And Narrative
Citation Location:	NPS, Denver Service Center

Citation Author:	Shaw, Richard J. and Danny On
Citation Title:	Plants of Waterton-Glacier National Park
Year of Publication:	1979
Citation Publisher:	Missoula, Montana: Mountain Press Publishing Company
Source Name:	Library Of Congress/Dewey Decimal
Citation Number:	QK171.S5 1979
Citation Type:	Both Graphic And Narrative
Citation Location:	Denver Public Library

Citation Author:	Scharff, Robert, ed.
Citation Title:	Glacier National Park and Waterton Lakes National Park
Year of Publication:	1967
Citation Publisher:	New York: David McKay Company, Inc.
Source Name:	Library Of Congress/Dewey Decimal
Citation Number:	F737.G5 S3
Citation Type:	Narrative
Citation Location:	Denver Public Library

Citation Author:	Reeves, Dr. Brian and Dr. Sandra Peacock
Citation Title:	"Our Mountains Are Our Pillows," An Ethnographic Overview of Glacier National Park
Year of Publication:	2001
Source Name:	Other
Citation Type:	Both Graphic And Narrative
Citation Location:	Cultural Resources Files, Intermountain Region Support Office, NPS, Denver

Citation Author:	Frank A. Kittredge
Citation Title:	Trans-Mountain Highway, Glacier National Park. Report to National Park Service.
Year of Publication:	1925
Citation Publisher:	U.S. Bureau of Public Roads
Source Name:	Other
Citation Location:	Glacier National Park

Citation Author:	Thomas C. Vint
Citation Title:	Memorandum to D.R. Hull, Chief Landscape Engineer Re: Report by Highway Engineer Frank A. Kittredge of the 1924 B.P.R Survey of the Trans-Mountain Road, Glacier National Park
Year of Publication:	1925
Source Name:	Other
Citation Location:	Glacier National Park

Citation Author:	E.T. Scoyen
Citation Title:	Letter to the Chief, Western Division, Branch of Plans and Design, National Park Service.
Year of Publication:	1935
Source Name:	Other
Citation Location:	Glacier National Park